THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[Registered as a Newspaper.]

Vol. XXXII. No. 799.] LONDON, SEPTEMBER 3, 1878. [30th Year.] Price 6d.

GAS PURIFICATION
BY
OXIDE OF IRON.

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SPENT OXIDE PURCHASED IN ANY QUANTITY.

GENUINE TORBAY PAINT
And SPECIAL GASOMETER PAINT.
Several Prize Medals. Established over 20 Years.
These Paints are now used in over 200 Country Gas-Works, and by all the London Gas Companies, on Gas-holders, Scrubbers, Purifiers, &c. Also used by the Admiralty, War Office, Railway Companies, Founders, &c. They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations; do not crack, blister, or flake off; will cover tar effectually.
The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov. 2, 1866.*
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Gas, Water, & Sanitary Purposes,
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WOOD GRIDS
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JOSEPH COWEN and CO.,
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Were the only parties to whom a Prize Medal was awarded at the Great Exhibition of 1851, for "Gas-Retorts and other Objects in Fire-Clay," and they were also awarded at the International Exhibition of 1862, the Prize Medal for "Gas-Retorts, Fire-Bricks, &c., for Excellence of Quality."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
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Jos. Cowen & Co. are the only Manufacturers of Fire-Bricks and Clay Retorts at Blaydon Burn.

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Established at the commencement of Gas Lighting.
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J. R. & Co., Ld., make all kinds of Tubes and Fittings for Gas, Steam, and Water; Gun-Metal Cocks, Stocks, and Dies; Galvanized Tubes and High-Pressure Tubes, &c.
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Manufacturers of
WET AND DRY GAS-METERS,
Licensees and Manufacturers of
HUNTS
PATENT COMPENSATING METERS,
STREET-LAMPS, &c., &c.
Established 1830.

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TELESCOPIC & SINGLE GASHOLDERS,
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SILVER MEDAL, PARIS EXHIBITION, 1867.

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EITHER BLACK, GALVANIZED, OR ENAMELLED HOT WATER TUBES AND FITTINGS,
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CHANDELIERS, &c., GAS-FITTERS' TOOLS, GAS TONGS, STOCKS, TAPS, DIES, &c., &c.,
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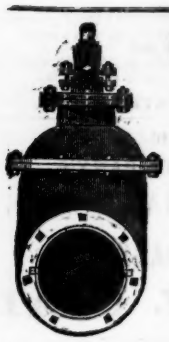
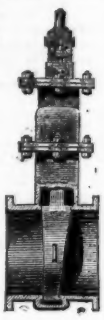
TELEGRAPH TUBES OR POLES, &c., &c.



C. & W. WALKERS' DOUBLE-FACED GAS-VALVES.



These solidly constructed double-faced Gas-Valves have taken the place of the old system of the light, single-faced disc, which is too uncertain and unreliable in large bores.

They are guaranteed absolutely gas-tight. They are very massive and rigid, and by improved modes of manufacture they are produced at very little excess in cost over the old light, weak system, which is liable to spring and bend, and become leaky.

The Valve is a rigid wedge of solid cast iron, having two perfectly scraped surfaced facings fitting between the two on the body, which are also surfaced.

A spring in two short halves, and, therefore, not liable to break, is used only for scraping the front facing clean.

The front facing is vertical; the back facing forms the wedge.

At a slight additional expense both flanges are faced to bolt to main-pipes.

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ROSE MOUNT IRON-WORKS, ELLAND, YORKSHIRE.
MANUFACTURERS OF EVERY DESCRIPTION OF
GAS APPARATUS;
CONTRACTORS FOR THE
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The only Prize Medal awarded for TUBES & FITTINGS.

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PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

SOLE MANUFACTURERS OF LIVESEY'S PATENT GASHOLDER MAN-LID,

By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

Drawings, Specifications, and Estimates supplied on application.

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This Company is now in a position to raise **2000 tons per day of REAL OLD SILKSTONE GAS COAL.**

"The quality of this Coal for Gas purposes, if equalled, is not excelled by any on record, and the Coke competes successfully with best Durham."—See *Mining Journal*, Aug. 11, 1877.

Prices quoted to any Railway Station, or F.O.B. Hull, Grimsby, Goole, Keadby, Liverpool, and Fleetwood.

Full particulars will be sent on application to above address.

LIVESEY'S PATENT WASHER.

This apparatus effects the most intimate contact between the liquor with which it is supplied and the gas passing through it, resulting in the complete removal of all particles of tar, increasing the ammonia strength of the scrubber and condenser liquor, and removing a large proportion of other impurities—notably, carbonic acid. The Washer is intended to work in conjunction with a scrubber. It occupies little space, and is inexpensive. It has been in successful constant use for nearly three years, does not become clogged with tar or corroded by the action of the liquor or gases, it gives three inches of pressure, and only needs a supply of liquor to keep it in regular action without any further attention.

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Messrs. BAILEY, PEGG, AND CO., Bankside, LONDON, S.E., for the South;
Messrs. WILLEY AND CO., Commercial Road, EXETER, for West of England and South Wales;
Or to the PATENTEE, 589, OLD KENT ROAD, LONDON, S.E.

IMPROVED
COMPENSATING GAS-METER.
HUNT'S PATENT.

This Meter supplies a want long felt, by putting an end to the loss sustained by Gas Companies through the overworking of their Meters.

These Meters can now be supplied in either TIN-PLATE or CAST-IRON CASES, and OLD METERS converted to this plan. GAS COMPANIES and CORPORATIONS will find it to THEIR ADVANTAGE to adopt these Meters.

EXTRACTS FROM REPORTS.

"I am able to report that the Meters have given in each test most satisfactory results."—*Mr. H. Sporne, City of London Meter Inspector.*

"I consider the arrangement is a great improvement upon the Meters in present general use."—*Mr. T. Jackson, Meter Inspector, Birmingham.*

"I would observe from the results of my testings that the Meters are a great improvement on the ordinary Wet Meters in general use."—*Mr. H. Airey, Meter Inspector to the Metropolitan Board of Works.*

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JOHN BENT & SON,

WET AND DRY GAS-METER AND GAS APPARATUS MANUFACTURERS,

BELL BARN ROAD, BIRMINGHAM.

Established 1830.

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BY

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GAS PURIFICATION & CHEMICAL Co., LIMITED,

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JOHN WM. O'NEILL, Managing Director.

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Will be glad to supply the above on the most favourable terms, and to treat, by Purchase or Exchange, for Spent Oxide.

PRICES ON APPLICATION.

ALSO PATENT DRY COPPERAS FOR EXTRACTING AMMONIA.

VICTORIA CHEMICAL WORKS, BRADFORD, NEAR MANCHESTER.

THE

STANDARD WASHER AND SCRUBBER.

[KIRKHAM, HULETT, AND CHANDLER'S PATENT.]

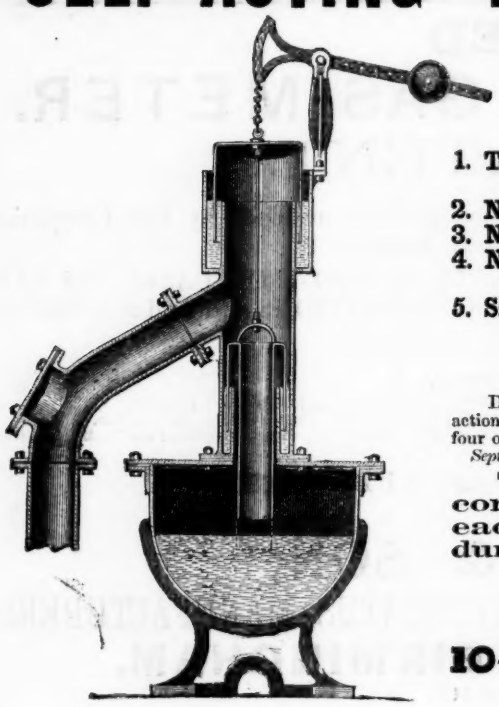
Some of the advantages claimed for this Apparatus are as follow:—

The Exposing of a large Amount of Effectually-wetted Surface (which is continually reproduced) to act upon the Gas.
Unerring Regularity in the Distribution of the Liquor.
Saving of Expense in Providing and Exchanging Scrubbing Material—none being required.
Economy of Space, thus enabling the Apparatus to be protected from the Weather.
Economy of First Cost and of Maintenance.
It works without Pressure.
It is particularly adapted for Gas-Works where Sulphate of Ammonia is manufactured.

Applications for Prices, &c., to be made to

Messrs. KIRKHAM & HERSEY, GAS ENGINEERS, 21, ABINGDON STREET, WESTMINSTER.

SELF-ACTING REMOVABLE DIP-PIPE,



PATENTED BY

CHANDLER & STEVENSON.

ADVANTAGES.

1. **There is no pressure on the Retorts.**
2. **No deposit of Carbon.**
3. **No scurfing is required.**
4. **Never a choked Ascension-Pipe.**
5. **Saves Fuel and Wear and Tear.**
6. **Gets 10 per cent. more Gas out of the Coal, and a higher Illuminating Power.**
7. **Is never out of order.**
8. **Requires no attention.**
9. **Is perfectly automatic in its action.**

Testimonial from the Proprietor of the Apeldorn Gas-Works.

DEAR SIR,—In reply to your inquiry, the Self-Acting Dip-Pipes, which have been in action at my works for two years, give entire satisfaction. I forward you order for four others.

Yours truly,

Sept. 9, 1877. R. BAKKER.

These Dip-Pipes can now be supplied complete, except the flanched bend, for £4 each, which includes the charge for licence during the whole term of the patent.

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Who fix the Dip-Pipes, at a small Charge, when required.

GEORGE ORME & CO.,

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WET AND DRY GAS-METERS,

STATION-METERS, GOVERNORS,

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LAMP-METERS IN CAST-IRON BOXES,

And every Description of Gas Apparatus.

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ESTIMATES FOR GAS-WORKS OF ANY SIZE.

REFERENCES TO 500 WORKS ALREADY ERECTED.

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OF THE HIGHEST EXCELLENCE ONLY;

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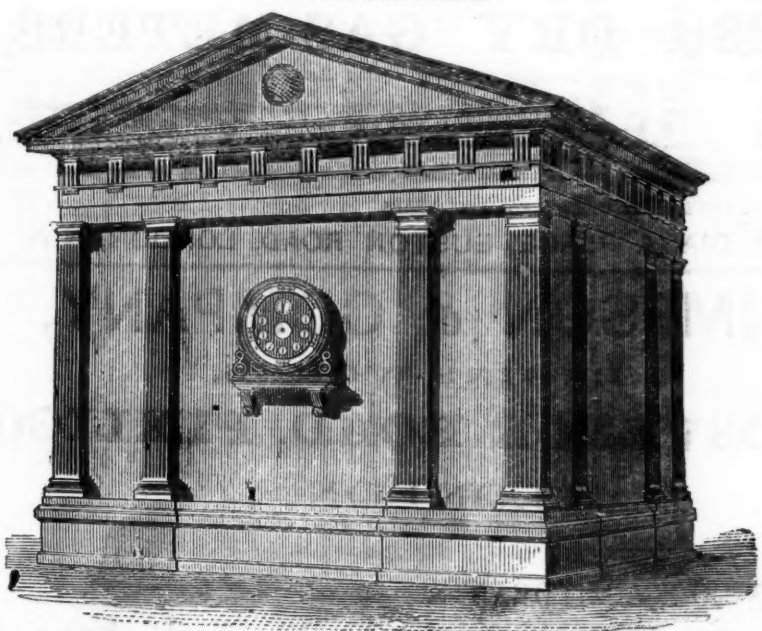

SQUARE STATION-METERS,

WITH PLANED JOINTS.

GOVERNORS, GAUGES, INDICATORS, MAIN COCKS, &c.

GAS COOKING APPARATUS.

Home and Foreign Orders promptly attended to.

All Sizes of CONSUMERS METERS, STATION-METERS, and GOVERNORS generally in Stock.

Orders almost invariably despatched on the day of receipt.

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YEO'S PATENT ENGINE PACKING,

Price 1s. 8d. per lb., any size.

Tarred & White Spun Yarn for Pipe Joints, at various prices.

Samples and testimonials free per post.

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WOOD PURIFIER SIEVES,

Which have now been used for fifteen years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

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ESTABLISHED IN 1860.

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THE ORIGINAL MANUFACTURER OF THE IMPROVED

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FOR

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WOOD SIEVES,

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MADE BY MACHINERY

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STREET

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The NEW PATTERN

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GRIRDROD'S PATENT

PORTABLE PIPE SCREWING

MACHINE,

For 1 in., 1¼ in., 1½ in., and 2 in. Gas Threads, complete £7 10s.

In use at the chief gas-works, and giving great satisfaction.

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FOR ENGINEERS,

STEEL OF ALL DESCRIPTIONS,

SCREW STOCKS, TAPS, AND DIES, SPANNERS

RATCHET BRACES, LIFTING-JACKS,

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The only Gold Medal awarded for "Apparatus and Processes for Heating and Lighting" by the Imperial Commissioners.

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ROLLED METALS, LOCOMOTIVE AND CONDENSER TUBES, CYLINDERS;

Ornamental, Taper, and Cased Tubes;

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GAS-FITTINGS, CHANDELIERS,

BRACKETS FOR HEATING AND LIGHTING;

METALLIC BEDSTEADS.

Ecclesiastical and Mediæval Metal Workers.

GENERAL BRASSFOUNDERS.

REGISTERED TRADE MARK:

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OF THE

FRICTIONLESS DRY GAS-METERS,

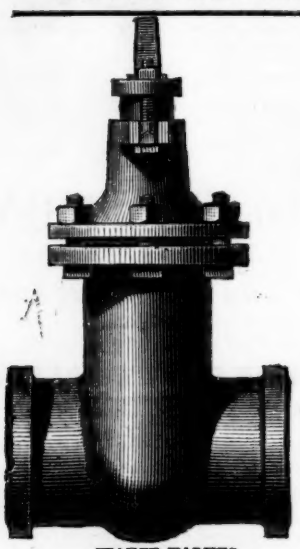
Beg to intimate to Gas Companies and others that they are now prepared to supply these very superior Meters at the same prices as for the ordinary Gas-Meters.

In the construction of this Meter, for which the best tin plates only are used, every mechanical contrivance has been taken advantage of successfully to reduce the friction to a minimum, which is amply proved by the fact that they are made to work upon only one-fortieth of an inch pressure. By an improvement also in their construction, a steadier light is obtained, and greater capacity than can be got from any other Meter in the market. No gas can pass under the valves on any back pressure, as is the case with many other Dry Meters.

To Gas Companies supplying gas through streets with heavy gradients, these Meters are invaluable, as much gas is saved from the low pressure required to work them.

ALL METERS ARE UPHELD FOR FIVE YEARS.

METROPOLITAN WORKS, DIANA PLACE, EUSTON ROAD, LONDON, N.W.



WATER-VALVES.
All Sizes, Flange and Socket, kept in Stock, tested to 1000 feethead.

SIMPSON & COMPANY,

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GROSVENOR ROAD, PIMLICO,

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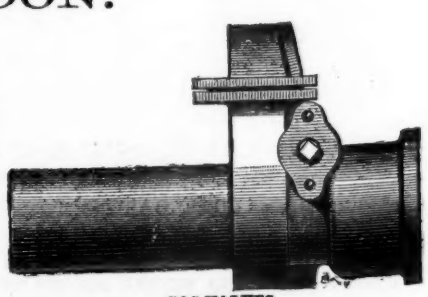
SCREW-COCKS, HYDRANTS,

SLUICES, PENSTOCKS,

And all other Machinery for

WORKS OF WATER SUPPLY, DRAINAGE AND IRRIGATION.



GAS-VALVES.
All Sizes, Flange and Socket, kept in Stock, tested to 100 feet head.

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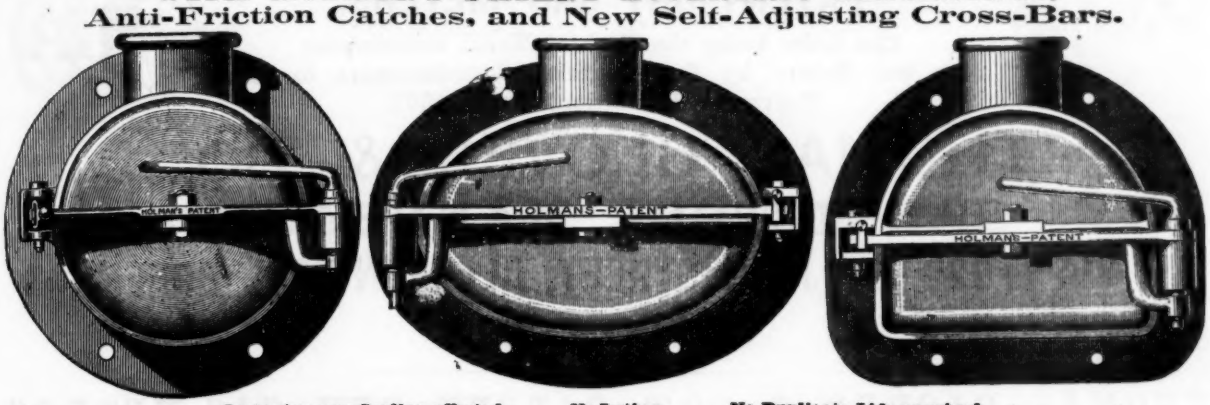
CORNWALL HOUSE, 35, VICTORIA ST., LONDON, E.C.

(LATE OF 10, LAURENCE POUNTNEY LANE.)

SOLE MAKERS OF MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH HOLMAN'S PATENT ECCENTRIC FASTENINGS,

Anti-Friction Catches, and New Self-Adjusting Cross-Bars.



Instantaneous Sealing effected. No Luting. No Duplicate Lids required.

Holman's New Self-Sustaining Cross-Bar ensures freedom of Joint, and maintains parallel position of the Lids.

Since their introduction in 1869, these Patent Retort-Lids have been thoroughly tested, being now in use in nearly all the principal Gas-Works in London and the Provinces.

T. B. and H. are now making the "Morton's Self-Sealing Lid" of the SAME FORM OR SECTION AS THE RETORT (see Illustrations above), as well as bringing the Mouthpiece from the D or Oval at back to Circular in front, as heretofore.

D and Oval Morton's Lids are working satisfactorily both in this country, on the Continent, and in the United States of America. Among others they have been adopted by the following Gas-Works:—

The Gaslight Company's Works, Fulham; Ditto, Bromley-by-Bow; Ditto, King's Cross; Ditto, Shoreditch.
And also in the Gas-Works at Richmond, Maidstone, Gloucester, Glasgow, Portsea, Roubaix (France), The Hague (Holland

HUNT'S PATENT EQUILIBRIUM GAS-GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown in the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

The valve portion being separate from the holder, it can be handled and fixed like an ordinary Slide-Valve direct in the main; and the holder can be placed at an convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.

These Governors have been adopted by many leading Gas Companies, among whom are the following:—

The Gaslight and Coke Co. (9), The London Gas Co. (3), and at Abergavenny, Arundel, Birmingham, Cannes (France), Devonport, Dursley, Exeter, Guernsey, Halesowen, Mentone (France), Monmouth, Newcastle-on-Tyne, Oxford, Plymouth, Rochdale, Windsor, &c.

TESTIMONIAL.

The Gaslight and Coke Company,
9, Water Street, New Bridge Street,
Blackfriars, E.C., Feb. 27, 1875.

MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve-rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

Yours truly,
(Signed) JOHN JOHNSON.

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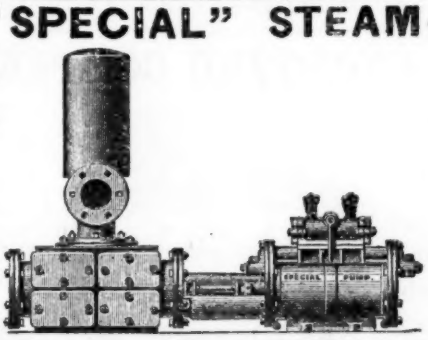
4	2	9	815	18
5*	2½	12	1,250*	20
5*	3	12	1,830*	22 10
4	4	12	3,250	25
6*	4	12	3,250*	30
5	5	12	5,070	32 10
7*	5	12	5,070*	40
6	6	12	7,330	40
8*	6	12	7,330*	50
7	7	12	9,750	50
10*	7	12	9,750*	65



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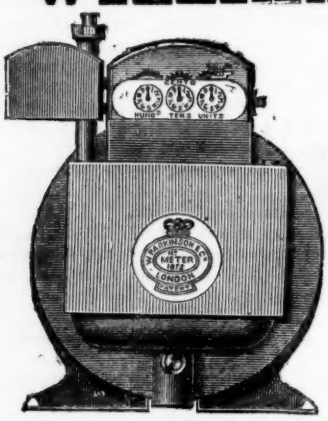

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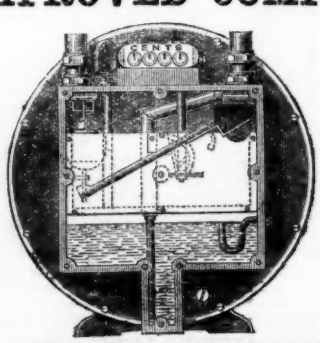

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COTTAGE LANE, CITY ROAD, LONDON, E.C.

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

GAS-FITTER; A SUBSCRIBER FROM NO. 1.—*Galvanized iron service-pipes when laid in the soil, and especially in moist soil, are very apt to decay. If laid in pitch troughs, as is now common, their use will be found advantageous and cheap.*

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, SEPTEMBER 3, 1878.

Circular to Gas Companies.

AN interesting article on the electric light appeared in the *Dundee Advertiser* of the 27th ult. The writer, an able engineer as well as a literary man, and not unknown in the gas world, has taken some pains to ascertain the capabilities of the light, and its future prospects. He believes that, in its present state of development, it is quite equal to the illumination of large spaces, halls, threatres, and even public streets. We do not share in all his opinions, for it would be apparent to any observer that the light used on the Tay Bridge was perfectly unadapted for the illumination of a public place. The same may be said of the lamps now in use over the Gaiety Theatre, in which at least fifty per cent. of the light generated by the machine has to be cut off to render it endurable. Experiments like those made in Paris, at the recent National Fête, are not of the smallest use in determining the value of an invention for economic purposes. No one has yet proposed to illuminate the streets of London by means of magnesian balloons, which Mr. Brock displays with so much effect at the Crystal Palace; but really at the present moment the one mode of illumination is quite as reasonable as the other. As is very properly said in the *Dundee Advertiser*, the electrical invention is not yet perfected. Much more is to be expected than has hitherto been realized; but we believe we shall have to wait long for the anticipated improvements. In the meantime, our Scotch contemporary points out, as we have already done, that Gas Companies, the existing purveyors of light, should place themselves in a position to make use of any invention which is calculated to affect or supersede their present industry. We are still in the dark as to the cost of the electric light; but some knowledge on this head will be gained by the experiments now being made by the Chartered Company, and possibly by those at the Gaiety Theatre. The introduction of the light into workshops is a noteworthy fact, and it may seem strange that more use has not been made of it in this country. The reason, however, is very apparent. Gas is so much cheaper and so much better here than in France, that but little advantage, either in illumination or cost, is to be expected from the use of the electric light in this country.

A correspondent, whose name we once more welcome to our columns, points out, in a communication we publish elsewhere, that some serious effects may be expected to ensue from the use of the electric light. We have ourselves expressed an opinion that ophthalmia may be a common result; but our correspondent anticipates still worse evils. Cases of amaurosis and of cataract he expects will be as plentiful as blackberries in autumn. He gives his reason for his belief, and as a medical man and a physicist some weight will be attached to his opinion.

The panic on the Stock Exchange in gas shares has ceased, leaving them, however, at lower quotations than have been made for a long time past. It is still doubtful what caused this scare—whether the action of speculators, or fear on the part of the holders that gas property would be seriously depreciated by the electric light. We have done our best to assure our readers that, for many years to come, the electric light, in a far higher state of development than it is found in to-day, can be no serious competitor to gas. We have repeatedly mentioned that the strongholds of Gas Companies are shops and houses, and wonderful will the discoveries be before a fifteen-candle electric light is produced, and whenever it is, what will be its cost?

There are rumours that, besides the electric light, another new invention threatens the interests of the Gas Companies. We have no knowledge of what this may be; but perhaps some sharp stockbroker has been perusing our columns, and learnt that Mr. Stephan, of Worcester, has a process which will enable him to supply gas for nothing.

The Town Council of Leicester are rejoicing over the success of the first half year's working of their gas undertaking. The profit made during this period has amounted to £17,284. Of this sum, £9991 goes to the Shareholders of the late Company, in payment of their ten and a half per cent. dividend, and the remainder—£7292—is to be added to the reserve-fund which the Corporation took over from the Gas Company. This fund will now amount to £42,311, which it is proposed to carry to the new capital account. Alderman Grimsley recommends that a reserve-fund of £5000, as allowed by the Leicester Corporation Gas Act, be formed. We may express an opinion that this sum will be insufficient to secure the Corporation from loss in the case of accident. A great fire like that of Lister's, at Halifax, or the Liverpool landing-stage, or the two London fires for which Gas Companies had to pay, would place the Corporation in difficulties. We have not their Act before us at the present moment; but if that allows of the formation of a contingency-fund, it ought to be commenced at once, and added to as fast as possible.

The Wolverhampton Gas Company held their half-yearly meeting on the 27th ult., when the Directors presented a very gratifying report. Full dividends are to be paid as usual, and consumers are informed that a further reduction of one penny per thousand cubic feet will be made on and from Oct. 1 next.

The Town and County of Poole Gas and Coke Company also pay full dividends for the half year, but not without making another draw on their reserve-fund. The Directors appear to be doing their best, but certainly are not successful in arresting leakage. They are enlarging the mains, and we must suppose are having them well laid; still the loss by leakage in the past half year has run up from sixteen and a half to twenty-four and a half per cent. of the make. Under these circumstances, it is

not to be wondered at that no announcement of a reduction in the price of gas was made at the meeting, and therefore we may suppose that petroleum will continue to be used in the public lights of the town. The Company are not very fortunate in other respects; coke does not go off, and, therefore, it is "esti- "mated in the revenue account" at a lower figure than in the corresponding half year. One advantage, it seems, will be gained by the alterations and extensions now being made at the works; the Company will be enabled to dispose of their ammoniacal liquor, which, it appears, they have never yet done. We wonder it never occurred to the Directors to make it up themselves into sulphate of ammonia. The proceedings of the half-yearly and extraordinary meetings, which will be found in another column, are rather interesting. We do not care to make further remarks, but we may express a hope that at the next meeting a somewhat different report will be presented.

The South Shields Gas Company held their half-yearly meeting on the 29th ult., and declared their usual interim dividends—four and a half and three and a half per cent. The Company are looking forward to, and are providing for, a large increase in business. Their exhibition will, no doubt, have added largely to the use of gas for cooking and heating purposes. The revival in the coal trade, which is already beginning to be apparent, will also add greatly to the consumption. It was announced that the Company will go to Parliament next year for power to increase their capital. No opposition, we may take it, is likely to be raised, and the Company may reckon upon prosperity. It is gratifying to notice that, notwithstanding the liberal reduction made in the price of gas, the usual dividends can be paid out of current profits.

The rapid growth of Eastbourne necessitates large additions to the plant of the Gas Company, and the works are being rapidly executed. In the meantime, the profits of the Company for the past half year permit of the payment of full dividends. The reduction of price to the extent of fivepence per thousand feet, which is announced, will, at the present rate of consumption, diminish the income of the Company by £1000 per annum. Further than this, considerable additions to capital account will require more profit to pay dividends; but we are certain the Company are pursuing a right course in lowering the price, and adding to the works.

We forgot last week to allude to the half-yearly meeting of the Liverpool United Gas Company. Their accounts are, of course, highly satisfactory, full dividends are declared, and a considerable balance is then left. It is greatly to be regretted that the negotiations between the Company and the Dock Board have not resulted in a settlement of the claims of the latter in respect of the fire at the landing-stage. The case has gone to arbitration.

We have but a very short report of the annual meeting of the Maidstone Gas Company, but it is satisfactory, inasmuch as it informs us that the usual dividends are paid all round. We should have been glad to have had details of the working of the Company, which would, doubtless, have presented much interest. Many in the gas world are looking with curiosity to Mr. West's process, and would have been glad to have learned the results in its native home.

The Shareholders of the Faversham Gas Company are made happy by receiving a ten per cent. dividend and a bonus of £2 per share. Consumers will also rejoice at a reduction of price to 4s. per thousand feet, with a discount of threepence per thousand feet for prompt payment. Full dividends are now almost universally the rule. The Cardiff Gas Company pay them, so do the Newport (Monmouthshire) Gas Company, and also the Wellingborough Gas Company, Limited.

The two Brighton Gas Companies necessarily continue in a prosperous state. Each is able to pay full dividends, the only difference being that one pays them less income-tax, and the other free of the tax. Both lament over the want of a sale for coke and other residuals. Coke, we fear, may continue for some time to be a drug in the market at Brighton, and nothing could force a sale but disposing of it at a very low price. Suppose the Companies were to turn their attention to the hiring out of coke stoves? Such a system has been found in other places to promote the sale of this residual.

A small exhibition of gas cooking and heating apparatus has recently been held at Elland, projected by the Secretary and Manager of the Gas Company, who reasonably anticipates a large increase in the consumption of gas in consequence. It may be worth mentioning here that, in connection with the exhibition of the Royal Agricultural Society, to be held in the Metropolis next year, there will be a very large display of gas cooking and heating apparatus. We are glad to see that the Metropolitan Gas Companies are making contributions towards the expenses of the display and the costs of the prizes. They have a legal right to apply their funds towards any object which is calculated to advance their business; and, inasmuch as consumers may largely profit if they will only learn the lessons taught at these exhibitions, they may be greatly benefited by the liberality. After all that can be said, a contribution of this kind can only be looked on as payment for an advertisement.

Water and Sanitary Notes.

We are glad to see that others besides ourselves are impressed with the desirability of amalgamation among the Metropolitan Water Companies. The case of the Southwark and Vauxhall and the Lambeth Water Companies calls loudly for union. The letter signed "Hydrodynamics," which we publish in another column, points out how advantageous the amalgamation of these two Companies would be, both to the public and the Shareholders. They are now mixed up together in a most anomalous manner. In past times, districting could not disentangle them, and years after their districts had been allotted, and a complete separation supposed to have been effected, many instances were discovered in which one of the Companies supplied the water and the other charged for it; and perhaps some cases of this kind might be found even to-day. The economy which would result from the amalgamation is not, we think, over-estimated by our correspondent, who is, we may mention, well acquainted with Metropolitan water affairs. The London Companies are conveniently situated for pairing. The East London and the New River Companies could easily combine their arrangements; so also could the West Middlesex and the Grand Junction Companies; but, undoubtedly, the Southwark and Vauxhall and the Lambeth Companies are best circumstanced for union; in fact, it may be said that amalgamation in their case is imperatively required.

The dispute between the Wimbledon Local Board and the Lambeth Water Company will probably go to arbitration, under the Public Health Act, 1875. Our readers will remember that the Board were anxious to have a supply of their own, which was to come from the chalk. The Lambeth Company, however, refuse to supply water from any other source than the Thames at Molesey, and, moreover, announce their intention to contest the legal right of the Board to set up a water undertaking. One difficulty is that the Board require water to be supplied at such a pressure as will force it to the top floors of the houses in the highest parts of the Board's district. The Lambeth Company offer to furnish the water from their Norwood reservoir, which is three hundred and fifteen feet above Trinity high-water mark. This height will, perhaps, enable the water to reach the tops of the houses on Wimbledon Hill. We are somewhat astonished that the Board did not at once close with this liberal offer. It may still be accepted, for, as yet, arbitration is only talked of.

Alderman King, of Manchester, continues his opposition to the Thirlmere scheme, and, in view of the poll to be taken in a few days, has written another long letter to the *Manchester Guardian*, setting forth his opinions—first of all, that Manchester has enough water for many years to come; secondly, that there are cheaper sources of supply nearer home; and, thirdly, that the execution of the Thirlmere scheme would place a mountain of debt upon the shoulders of the city. He has some other reasons, which are unimportant, and therefore we do not quote them.

It seems doubtful whether or not it will be possible for the Liverpool Corporation to have a Bill prepared ready for the next session to carry out the Verniew scheme, which we suppose it has been decided, at all events, to attempt. There is but little time left for the preparation of plans and drawings, which must necessarily be of an extensive character. They could, of course, be got ready in time; but, as Mr. Deacon pointed out, plans prepared in a hurry cost a good deal of money. We shall learn more, however, respecting this matter at the next meeting of the Town Council. In the meantime, Worcester has taken alarm, and the Corporation of that city are vigorously protesting against the appropriation by Liverpool of the head waters of the Severn. Alderman Bennett's pet scheme for a deeper boring at the Bootle Well is so far carried, that the Committee have recommended that the boring be continued below its present depth of 1001 feet, and that the work be done by the Diamond Rock Boring Company. It is said that the water brought up from the present depth is seven degrees softer than that taken at the highest level.

The Asylum Committee of the Corporation of Norwich have resolved on obtaining an independent supply of water and making their own gas at their new asylum at Hellesdon. It seems that the Norwich Water Company cannot send water above the

first floor of the building, which stands on a height; and that to lay down pipes for a supply of gas from the Gas Company would cost between £400 and £500. Under these circumstances, the Committee may be justified in setting up independent works; but if the question had been further gone into, they might possibly have found that it would have been cheaper to have taken water of the Company, and pumped it to the roof, and also to have incurred the cost of a gas-main rather than that of new works. In the course of a discussion on this matter in the Town Council, the question of the purchase of the two Companies cropped up. With regard to the Water Company, the public in the city are extremely well satisfied with it, and, we are certain, will not support a movement to effect a purchase by the Town Council. The British Gas Company give scarcely less satisfaction, and agitators for purchase, we fancy, have very little chance of success in Norwich.

The penultimate meeting of the Stockton and Middlesbrough Water-Works Company was held on the 28th ult., when it was proposed to divide among the Shareholders a further sum of £213,804. A still further sum has to be paid over to the Shareholders, after which a balance will be left, a portion of which it is proposed to divide among the Directors. A Preference Shareholder objected to the allocation, and proposed that some of the moneys now on hand should be divided between him and his fellow Preference Shareholders, inasmuch as they had not participated in the extraordinary profits divided amongst the Ordinary Shareholders. The Preference Shareholders have received, however, all to which they were entitled. It is the opinion of the Chairman of this meeting that the Corporations have a very good bargain, and that when a revival of trade comes there will be a margin of profit left after paying all the interest they are liable to, "provided they would do "what Corporations hardly ever do—manage their works well." Let us hope the revival of trade will come soon. Coals are already rising in price. Midhat Pasha and the Duke of Sutherland are closeted at Dunrobin Castle, planning a network of railways to cover Asia Minor, and also other parts of South-Eastern Europe. The ironmasters of Middlesbrough may relight their furnaces. Rails will shortly be in great demand.

The South Staffordshire Water-Works Company have recently held their half-yearly meeting, at which a dividend of four per cent. was declared. The Company are looking forward to better times, which will no doubt come, and in the meantime have converted their share capital into stock, and decided to raise £87,500 of new capital for the works authorized by the Act obtained last session. It has also been decided to raise debenture stock, at four per cent., to the amount of £21,875. It cannot be intended to raise all this capital at once. If it be, the dividends for the next few half years must necessarily fall. When, however, the long-expected revival of trade comes, the Company will make a rapid advance.

The Borough of Portsmouth Water Company pay nine per cent. per annum for the past half year. In view of the continued increase in the number of consumers in their district, the Company find it necessary to make application to Parliament for power to raise further capital for additional works. No Shareholder objected, but all seemed to approve of the management of the Directors.

The Rochester and Chatham Water-Works Company pay a dividend of seven per cent.; but, according to the Chairman, they had profits sufficient to pay ten per cent., if the Directors had been so minded. It has been arranged, however, to carry the balance to the reserve-fund. The demands on the Company for water are continually increasing, and it is found necessary to put down a more powerful engine and pumps.

The citizens of London, particularly those living in the western portion, are becoming alarmed at the unprotected state of their neighbourhood from fire. We think they are perfectly right in regarding their situation as dangerous. The City is now almost denuded of fire-engines, while the hydrant system is not yet fully completed. When it is, the citizens may look with complacency on the absence of fire-engines in their midst. At the present moment they are perfectly right in complaining of the state of things, which seems to leave them a possible prey to another great fire. It should be said that the Corporation have already expended £30,000 on hydrants, and that, it must be remembered, not the produce of rates, but out of the Corporation purse.

BELPER GAS COMPANY.—The half-yearly meeting of Shareholders was held on Tuesday last—Mr. J. Pym presiding. Mr. Ingle read the Directors report, which showed that the financial position of the Company was very flourishing. On the motion of Mr. Ashton, a dividend at the rate of 10 per cent. per annum for the half year was declared. Mr. Owen proposed a vote of thanks to the Chairman, Board of Directors, and Auditors for their past services.

Communicated Article.

DR. GERLACH'S MODIFICATION OF SOLVAY'S AMMONIA SODA PROCESS.

By Mr. W. MANN.

Mr. Marshall, in the interesting paper which he read before the last meeting of the British Association of Gas Managers on "Purification by Means of Liquids, principally Caustic Ammonia,"* adverted to Solvay's ammonia-soda process, as modified by Dr. Gerlach. Although I believe that this process has been noticed before in your columns,† yet it has not been recognized as an adjutory process capable of being associated with gas-works handicraft until the circumstance just mentioned. Therefore it will not seem out of place if I now lay it before your readers in outline, leaving them to judge for themselves how and in what manner it can best be filled in and made serviceable both as regards the application and working up of the ammoniacal liquor of their works.

In the ammonia-soda process, patented by M. Solvay, the ammonia obtained from the ordinary gas liquor is used in the production of carbonate of soda, not as it issues from the liquor when heat is applied to a vessel containing it, as Dr. Gerlach does, but as caustic ammonia; consequently, means have to be employed for arresting or eliminating the carbonic acid and sulphuretted hydrogen at the outset. Having procured a saturated solution of the chloride of sodium, he proceeds to force into it as much causticized ammonia as the solution can retain. Then, into this, which is now a fluid mixture containing common salt and ammonia, carbonic acid is pumped, to bring about the formation and precipitation of a bicarbonate of soda, leaving the chlorine of the chloride free to combine with the ammonia for the production of a chloride of ammonium.

M. Solvay seems to make no attempt to recover this as salammoniac, but rather seeks to decompose it for the sake of regaining the ammonia for further use in the manufacture of soda; and as the chlorine, in combination with the lime that is employed to aid in the decomposition of the salammoniac, is abandoned, we may infer that M. Solvay's was ostensibly intended to be a soda-making process only; but Dr. Gerlach's modification is designed to produce carbonate of soda as well as chloride of ammonium. The latter Dr. Gerlach recovers from the by-solution, for sale as salammoniac, instead of decomposing it for the furtherance of the production of soda alone.

Again, instead of charging the saline solution with causticized ammonia, Dr. Gerlach charges it with the ammonia compounds (carbonate and sulphide) as they come over from the heated liquor. But, as steam comes over at the same time, it is necessary that the mixed distillate be passed through coolers, in order to reduce the temperature of the gases and the volume of the water vapour. Care must be taken that provision is made for the returning of the condensement to the boiler, as a small portion of ammonia is sure to be carried down, which, but for some such expedient, would be lost.

There will, however, still exist aqueous vapour. This is allowed to flow onward with the gases to vessels containing dry chloride of sodium. In these, in consequence of the water vapour present, a deliquation takes place, brine is formed, and the gases absorbed thereby.

These means, if the distillate be properly regulated as regards temperature, and continued long enough, will produce a concentrated solution containing at least one equivalent of the chloride to one of ammonia; at any rate, care must be taken that this is the case.

When a sufficient quantity of the liquid mixture is ready, it is transferred to other vessels, for the purpose of submitting it to the carbonic acid treatment, to bring about the precipitation of soda, as a bicarbonate, and the combination of the chlorine with the ammonia to form salammoniac, which, being in solution, is crystallized out, and prepared for the market by any of the well-known methods. The same may be said as regards the means employed for the reduction of the bicarbonate to the ordinary carbonate of soda of commerce, care being taken that the carbonic acid driven off is reserved for further use.

It has been already mentioned that M. Solvay impregnates the solution of common salt with caustic ammonia; consequently, when the carbonic acid treatment is applied, there is no sulphuretted hydrogen given off, it having been dealt with at the outset; but, as Dr. Gerlach saturates the solution of chloride of sodium with ammonia, as evolved from the heated gas liquor, a different state of things has to be looked for at this point. The carbonic acid that was in combination with ammonia, when evolved from the liquor, acts in common with that pumped in; but the sulphuretted hydrogen that was in combination, being set free by the carbonating process, has to be got rid of according to the sanitary demands of the situation.

If, instead of chloride of ammonium, sulphate is required, a concentrated solution of the sulphate of soda, instead of common salt, is first made. Into this the distillate from ordinary gas liquor is passed, until a solution, containing equivalent proportions of ammonia and sulphate of soda is obtained. This is treated with carbonic acid as long as bicarbonate of soda is precipitated. On the bicarbonate of soda being removed, a mother liquor remains, containing sulphate of ammonia and some undecomposed sulphate of soda, as well as a certain amount of carbonate of ammonia. The carbonate of ammonia is driven off by heat, and is retained for use; and the heat being continued brings the liquid into a condition to yield the sulphates of soda and ammonia in crystals. The first is used again in the preparation of the solution of the sulphate of soda, while the ammonia is prepared for the market as usual.

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* See *ante*, p. 132.

† An illustrated description of the apparatus appeared in the JOURNAL, Vol. XXIX., p. 422.

Correspondence.

[We do not hold ourselves responsible for the opinions expressed by Correspondents.]

ELECTRIC LIGHT *VERSUS* GAS LIGHT.

SIR,—Although I had a hope that my gas days were ended, yet I now find myself compelled to seek refuge from labour by again taking up the pen upon the subject of gas lighting. In point of fact, so many persons have lately begged of me to favour them with my opinions upon the relative merit of electric light as compared with gas light, that I turn to your pages as the readiest mode of meeting and stopping the demand made upon me, though I cannot avoid saying that my opinions upon this matter appear to be greatly over-valued.

So far as the subject has yet been developed, it seems that the most economical form of electric lighting is obtained by an electric lamp, worked by one-horse power, and producing a light equal to 700 spermaceti candles; but any attempt to diminish this light is followed by a rapid increase in the comparative cost; so that, for all practical purposes in domestic economy, we are justified in asserting that it is impossible to produce an electric light equal to 15 spermaceti candles. Such a light has never yet been produced; and, if produced by any of the electric systems now in use, it would be found to be enormously expensive, and would far exceed the cost even of wax and spermaceti candles.

Under these circumstances, it seems, at least, to me, that no kind of rivalry or competition ought to exist between electric and gas lighting, for the electric light, if it ever comes into use, can only do so as a kind of wholesale light, or dealer in large quantities, whilst the gas-maker is content to supply the million with small or large quantities in small lots; in short, the one offers nothing less than 700 candles, and the other anything you please, down to one candle.

But, turning in another direction, by way of comparison, we may remark that for one person who wants to buy a whole sheep, there are ten thousand persons who require only a mutton chop; consequently, the retail butcher does not find himself in competition with the cattle dealer; or, if we are to speak in Yankee phraseology, we may say that the electric light "goes the whole hog," whilst the gas light is content with a rasher of bacon.

In truth, the two lights have as yet no kind of rivalry, from a domestic or consumers point of view; nor have any facts been developed which tend to show that the electric light can be so modified as to come into business competition with gas lighting.

This, however, is, by a very great deal, the smallest of the objections that can be raised to the domestic use of the electric light; but to render myself intelligible here, I must be permitted to say a few words about light itself, merely premising that in these remarks the Newtonian or corpuscular theory of light is adopted in preference to the undulatory theory. Thus regarded, light exists under two forms, which may be called "quantity" and "intensity," and these forms cannot be made to pass into or substitute each other; thus no amount of red-hot charcoal can ever produce a light having an intensity equal to the light of the sun; nor can the sun's rays be so modified as to give a light similar to that of red-hot charcoal. The first form, or "quantity of light," depends upon the number of particles of light in motion; the second form, or "intensity of light," depends upon the velocity with which these particles revolve around their own axes; so that light has two motions, which may be compared to the annual and diurnal motions of the earth, or, perhaps still better, to the motions of a rifle-bullet. In passing from one point to another, each particle of light travels at a rate which has been estimated as equal to 170,000 miles per second, but whilst so travelling it revolves or spins upon its axis with greater or less rapidity, and it is the rate of this rapidity which gives rise to the intensity of the light. Under all circumstances the travelling rate of light is uniform, but the revolving or spinning rate may vary greatly; and it is most likely this spinning motion which acts upon the organ of vision in animals, so that it is quite possible for a certain rate to produce no action—or darkness—upon the eye of one animal, and yet act strongly so as to produce clear vision in the eye of another animal. The perfection of a light for human use would seem to be a combination of great quantity, with such intensity as the optic nerve in the human retina is capable of bearing without strain or violence; and Providence has evidently aimed at this, for the area of the sun, which supplies us with light, is so vast that the quantity of particles emitted at the same moment is enormous, and, consequently, the sun's light has great quantity, whilst its intensity is so excessive that a provision has been made in the retina of the eye to counteract the injurious effects of that intensity. This provision consists in a thickened yellow spot or shield, upon which the condensed rays fall in the form of a focus, and thus protect the nerve or retina from violence. Now, it is only when the particles of light are travelling in lines parallel to each other that they can be reduced to a small focus equal to the size of this yellow spot—a condition beautifully secured by the great distance of the sun, which renders all the rays parallel, but which can never be obtained by any terrestrial light, in consequence of its near proximity to the eye or organ of vision. In all kinds of artificial light, therefore, the rays are very much dispersed, and possess none of that parallelism which softens the action of solar light, so that the rays of artificial light are not confined to the yellow spot or shield of the retina, but spread over the entire surface of the optic nerve, and thus create at first a sense of irritation, then a feeling of weariness, and ultimately a kind of exhaustion or dimness of sight, which, if long continued, ends in paralysis, or, as it is called by surgeons, "amaurosis." Nor is this the only disease produced by artificial light, for the divergence of the rays throws an additional strain upon the refractive powers of the crystalline lens, thus giving rise to a chronic inflammation, which leads to that form of opaque deposit in the lens called "cataract;" and these evil consequences we see are caused by the want of two conditions that exist in solar light—first, the near proximity of artificial light, as compared with solar light, causes great divergence or radiation; secondly, the small area of artificial light, compared with the solar area, adds immensely to that divergence, and thus greatly increases the evil. If I was asked whether I would prefer the light from 15 spermaceti candles to that from a gas-burner giving a light equal to 15 spermaceti candles, I would say in a moment, "Give me the candles," because the luminiferous area of the candles is much greater than that of the gas-burner, and, moreover, the intensity or whiteness of the light is less in the candles than in the gas light, consequently it will irritate the eye less. But, if I would thus prefer a candle to a gas light, what must I say to an electric light, in which the luminiferous area is a mere speck, and the intensity of the light enormous? My answer is easy. Such a light is altogether unfit for domestic use; and if ever it is generally adopted, I venture to predict that cases of amaurosis and cataract will be as plentiful as blackberries in autumn.

This, of course, is only my unsupported opinion; but there I am content to leave the question.

LEWIS THOMPSON.

Aug. 28, 1878.

METROPOLIS WATER SUPPLY—THE BENEFITS OF AMALGAMATION.

SIR,—I have been impressed from time to time with your remarks in reference to the Metropolitan Water Supply and the benefits of amalgamation, again referred to in the 20th of August issue of your JOURNAL.

On the south side of the Thames, an amalgamation of the Southwark and Vauxhall and the Lambeth Water Companies would be a boon alike to the Shareholders of the respective Companies no less than to the ratepayers.

The working expenses of the two Companies could be reduced, no doubt, 30 per cent., and further large expenditure of capital saved.

Can there be anything more monstrous to economy of working than that these two Companies should have mains running side by side through Vauxhall, Newington, Walworth, Brixton, the Borough, Southwark, and parts of Camberwell?

Then take the duplicate engine-power and cost of coal for these two Companies, which, by amalgamation, would be saved, to say nothing of the working expenses and staff.

This is a matter that should strongly commend itself to the earnest consideration of the Directors of the two Boards.

HYDRODYNAMICS.

Aug. 30, 1878.

MR. METHVEN'S NEW STANDARD FOR DETERMINING THE ILLUMINATING POWER OF GAS.

SIR,—Noticing in Mr. Methven's paper on this subject in your JOURNAL (see pages 95 and 96), that he said the standard was not dependent on the height of flame being accurately adjusted, and as this is a subject I have taken a great interest in for a number of years, I proceeded to verify Mr. Methven's statement by a number of experiments, out of which four are enclosed. Although I have failed to verify the statement as to the height of flame, the results are very interesting, and, as a friend of the despised candles, I beg to thank Mr. Methven for the idea which demonstrates them to be by far the most equitable standard.

I made the experiments on a Hartley's Improved Bunsen's Photometer, double candle. The tube connecting the burner on the candle end of the rail I divided into a scale of parts 1·5-10ths each, and made it moveable through a fixed stuffing-box, which enabled me to move the burner at will up and down. The centre of the slit in the screen I fixed level, in a line with the centre of the disc. I then proceeded to take ten slices each out of two flames, each slice 1·5-10ths thick, moving the burner up a slice during each observation, the first slice being just under the apex of the flame.

The first ten observations I took from two of Sugg's No. D "London" Argands, each with a 3·5-inch flame, and each consuming 0·613 cubic feet. The second ten observations, from two of Sugg's No. 4 "London" common steatite batswings, each consuming 0·706 cubic feet of gas. The third ten observations from the No. D Sugg's 3·5-inch flame, consuming as before 0·613 cubic feet against 40 grains sperm. The fourth ten observations from the Sugg's No. 4 batswing, consuming 0·706 cubic feet of gas against 40 grains of sperm.

		New Standard.		Old Standard.	
		First.	Second.	Third.	Fourth.
Slice	1 =	28·0	36·0	14·4	16·4
„	2 =	21·0	25·0	14·4	16·4
„	3 =	17·0	17·8	14·6	16·0
„	4 =	14·0	14·4	14·6	16·0
„	5 =	12·4	11·8	14·4	16·4
„	6 =	10·6	11·8	14·4	16·4
„	7 =	8·4	16·0	14·6	16·4
„	8 =	8·4	22·0	14·6	16·4
„	9 =	9·0	31·0	14·6	16·2
„	10 =	10·0	37·0	14·6	16·2
Average		13·8	22·2	14·5	16·2

The standard candle value of the gas, as consumed through the D "London" Argand = 19·70, and through the "London" batswing = 19·10 candles. The average of the second and third slices, in the first series of observations, gives 19·0 candles, and the average of the second, third, and fourth slices in the second series = 19·06 candles.

In careful experimental hands, Mr. Methven's method may give equitable results, but the range of error is within such limits that none but thoroughly practical hands could be trusted to manipulate it.

W. L

THE EXHIBITION OF GAS APPARATUS AT WOLVERHAMPTON.

SIR,—Referring to the letter of Mr. Reeves, in your issue of the 27th of August, we are sorry that he should make a general denial of our statements contained in our letter to you of the 20th. It would be more to the purpose (as the *Birmingham Daily Post* pointed out with reference to Mr. Edwardes's letter) had Mr. Reeves given some proof that the charges we made were untrue.

We can say, without fear of contradiction, that all these charges were fully gone into at the joint meeting of the Exhibitors and the Committee, that they were then and there fully proved, and that the Exhibitors—who were nearly all represented, and several of whom

were prize-takers—voted unanimously that, under the circumstances, there should be no awards made at all. A letter was also, at the same meeting, drawn up by the Committee to be sent to you, explaining the reason why the awards would be withheld. This letter was submitted to the assembled Exhibitors, and agreed to.

At this meeting the firm was represented whose stove was not in the Exhibition, nor seen by the judges until after the awards were made. The firm also was represented whose stove was not in the catalogue because of its admitted inferiority, and yet which had obtained a medal. There was every opportunity there for proving the charges we made to be false; but, on the contrary, they were all fully substantiated.

With regard to our alleged "inordinate ambition for medals," we can refer to our refusing those awarded to us as a proof that Mr. Reeves has here also made an error. We do, however, value such medals as we obtained at South Shields and Birmingham, where every possible test was used to arrive at a right decision.

Mr. Reeves is mistaken in saying that we wished to exclude Messrs. Billing and Co. from competition; and with regard to Messrs. Hassall and Singleton, as Mr. Reeves has mentioned the matter, we think the reason why a protest was entered against them (not by us, but by a deputation of Exhibitors) should be fully stated.

It was represented to us and to other Exhibitors that Messrs. Hassall and Singleton had, just previously to the judges going round, attached a lower price to one of their articles than the price named in the catalogue, and as soon as the judges were gone this lower price was removed. We did not see it, but we were asked, and consented, to form one of a deputation to wait on the judges and represent this to them. Two of the judges told the deputation that they thought it must have been a mistake, but Mr. Reeves himself said that it was no mistake, as he had particularly asked if that was the price, and the assistant in charge had told him that it was. The deputation certainly thought that this conduct should have disqualified Messrs. Hassall and Singleton, but the judges seem to have thought otherwise. Personally, we were not interested, as the stove of which the price had been falsely quoted was not a copy of one made by us, but of one made by another exhibitor.

With regard to Messrs. Clare and Co.'s letter, we have carefully looked over the awards given at Birmingham, and we fail to find that they received a medal there for a gas-fire. They exhibited one at Birmingham, but obtained no award for it.

The letter, however, is foreign to the matter of our complaint, which is this—that when the judges came round to our exhibit, we specially called their attention to our gas-fire, which they refused to look at, stating that they had no instructions to award any medal for gas-fires at all. To our astonishment, the following morning a silver medal was, we found, awarded to Messrs. Clare and Co.'s gas-fire (the only one the judges had looked at); and therefore it is incorrect for Messrs. Clare and Co. to say "the judges saw and knew all the kinds of gas-stoves."

We must further state that Messrs. Clare and Co. are mistaken in asserting that we did not light any of our gas heating-stoves. Probably their mistake arises from the circumstance that their exhibit was at the opposite corner of the show-yard to ours, and that they had not any means of ascertaining the fact of ours being lighted or not. Not a day passed but that one or more of them was lighted.

We are sorry to trouble you at this length, and hope that the majority of our fellow-exhibitors who feel as we do will take the matter up.

JOHN WRIGHT AND CO.

Essex Works, Birmingham, Aug. 28, 1878.

[We have also received a letter from Mr. J. E. Prust, which bears out Messrs. Wright and Co.'s statement in reference to the alteration of price of the "Workman's Stove" in Messrs. Hassall and Singleton's exhibits. —ED. J. G. L.]

STOPPAGES IN INLET-MAINS TO GASHOLDERS.

SIR,—Having noticed the correspondence of late on the above subject, I offer a course of procedure which is effectual in the worst of cases.

The cause of these troublesome stoppages is generally admitted to be naphthaline, produced partially, if not altogether, from high heats. This substance requires dissolution before it can be removed. Hot water only melts where it touches, and is, therefore, only partially effective; but steam *alone*, at a moderate pressure, introduced with due care as near as possible to the down pipe (where the stoppages generally occur, and mostly at this season of the year) of the holder to be operated on, will completely cure it. As a precaution, before applying the steam, pump the syphon-box dry, and pour into it some hot water to heat the bottom, so as to prevent the dissolved naphthaline from hardening and clogging up the pump. Continue the steam and the pumping from the syphon-pipe until the contents come clean.

A few days ago I had two holders operated upon; the syphon-box of one was two-thirds full with grit (a collection from the naphthaline from time to time), which hot water could not remove. Both were successfully cleaned in the manner above described.

ANDREW DONALDSON.

Queenstown Gas-Works, Aug. 24, 1878.

SALE OF GAS SHARES AT GUILDFORD.—Last Wednesday there were sold by auction some shares in the Guildford Gaslight and Coke Company, with the following results:—

£25	10 per cent.	A shares realized	. . . .	£50	5	0 per share.
3	5	"	B	"	"	. . . .	4	5	0	"
10	7½	"	C	"	"	. . . .	15	2	6	"
10	7	"	F	"	"	. . . .	14	15	0	"
10	5	"	G	"	"	. . . .	12	2	6	"

One small lot of F shares realized the remarkable price of £15 7s. 6d. per share.

CARDIFF GAS COMPANY.—The half-yearly meeting of the Proprietors of this Company was held on Tuesday last, and was presided over by Mr. G. Phillips. The report of the Directors and the accounts for the half year ending the 30th of June last were presented, and dividends at the rate of 10 per cent. per annum on the A stock, 8 per cent. per annum on the B stock, and 7 per cent. per annum on the paid-up capital created by the Act of 1870, were declared. The thanks of the meeting were voted to Mr. Bowen, the Engineer, to Mr. Stibbs, the Secretary, and to the Chairman and Directors, for their attention to the interests of the Company.

Miscellaneous News.

METROPOLIS GAS SUPPLY.

The Commercial Gas Company have recently appointed an able chemist to investigate what may be called the Chemistry of Gas Making and Purification. The gentleman selected for the post is Mr. H. L. Greville, one of the Gas Examiners under the Metropolitan Board of Works, who has been for many years assistant in the laboratory of Mr. T. W. Keates. We may express a hope that useful discoveries will result from the appointment.

METROPOLIS WATER SUPPLY.

HYDRANTS IN THE CITY.—The Gas and Water Committee of the Corporation have lately had under their consideration the subject of the supply of water for the extinction of fires and for street washing, and they have also presented a report to the Court of Common Council on the matter. In it they recommend—first, that they should be authorized to have branch-pipes, of the size required for supplying hydrants for fires and watering, laid in such streets as are about to be repaved by the Commissioners of Sewers; secondly, that where stand-pipes are to be placed by the Commissioners, in localities where hydrants might be required for the extinction of fires, they should be authorized to carry out the necessary works, at an expense not exceeding £1000; and also that it should be referred back to the Committee to continue their action on the general question of the establishment of hydrants for the extinction of fires within the City, reporting thereon to the Court of Common Council from time to time. In the result, the Committee recommend, with a view to the saving of expense and inconvenience to the public, that they should be authorized to take the necessary steps for carrying out the views of the Court, by laying down, before the pavements are relaid, the necessary branch-pipes, and affixing the proper hydrants, at an expense not exceeding £2800, which would allow 10 per cent. for contingencies. They further recommend that they should be authorized to continue their action in respect to the general question of the establishment of hydrants within the City, and ascertain the best mode of proceeding therein, whether by the selection of a particular district, or by applying the principle to some of the chief thoroughfares.

Major Bolton reports that the state of the water in the Thames at Hampton, Molesey, and Sunbury (where the intakes of the West Middlesex, Grand Junction, Southwark and Vauxhall, Lambeth, Chelsea, and East London Companies are situated), was in a good condition, and generally clear during the whole of the month of July. The highest flood state of the river at Hampton during the month was 6 inches above summer level, and the lowest 4 inches below the summer level. The water in the River Lea was also in good condition and generally clear during the month.

The following are the returns of the Society of Medical Officers of Health on the Composition and Quality of the Metropolitan Waters in August:—

NAMES OF WATER COMPANIES.	Total Solid Matter per Gallon.	Oxygen required by Organic Matter, &c.	Nitrogen.—As Nitrates &c.	Ammonia. Saline.	Ammonia. Organic.	Hardness (Clark's Scale). Before Boiling.	Hardness (Clark's Scale). After Boiling.
Thames Water Companies.	Grs.	Grs.	Grs.	Grs.	Grs.	Degs.	Degs.
Grand Junction	17·00	0·046	0·105	0·000	0·008	12·6	3·0
West Middlesex	17·60	0·050	0·105	0·000	0·008	12·6	2·8
Southwark and Vauxhall	17·30	0·053	0·096	0·000	0·008	12·6	3·0
Chelsea	16·70	0·035	0·090	0·000	0·007	12·6	2·8
Lambeth	19·10	0·050	0·129	0·000	0·008	13·2	3·0
Other Companies.							
Kent	29·10	0·003	0·435	0·000	0·002	20·5	6·0
New River	17·40	0·017	0·135	0·000	0·006	13·7	3·3
East London	18·60	0·039	0·090	0·000	0·007	13·2	3·0

Note.—The amount of oxygen required to oxidize the organic matter, nitrites, &c., is determined by a standard solution of permanganate of potash acting for three hours; and in the case of the metropolitan waters the quantity of organic matter is about eight times the amount of oxygen required by it.

The water was found to be clear and nearly colourless in all cases but the following, when it was slightly turbid—namely, Grand Junction Company.

C. MEYMOTT TIDY, M.B.

CITY OF ST. PETERSBURG NEW WATER-WORKS COMPANY, LIMITED.—The annual general meeting of this Company was held last Wednesday, at the City Terminus Hotel, London—Mr. T. W. Western in the chair. The report stated that the income of the Company, from sales of water during the year, had increased from 30,760 roubles to 50,434 roubles, being about 64 per cent. The revenue derived from plumbers work executed for customers, and from miscellaneous sources, also showed a small increase. The number of services laid was 410, of which 216 were upon contract, at fixed rates, 173 by meter, and 21 were not at present used. The expenditure at St. Petersburg had decreased, and the decrease would have been larger but for the diminished value of the paper rouble and consequent nominal increase of price of fuel and necessaries. No money having been remitted from Russia for the Company's use during the year, no direct loss of exchange had been incurred, but the indirect loss caused by the fall in value of the rouble was represented by an expansion of the Company's expenditure in currency to the extent of 10 to 15 per cent. on the whole expenditure. There had been some saving in the office expenditure. The arrangements made last year for undertaking the interior fittings of houses, in addition to the outside work, had fairly answered expectations. To a considerable extent this work had been executed by the permanent staff of the Company, and a fair profit had been realized thereon. No case of damage attributable to frost had occurred to the mains during the year. Only one case of fracture causing any serious trouble occurred, and the number of minor fractures and leaks had been fewer than last year. The Manager reported that since the opening of the present season the work of laying on services for new consumers was progressing steadily, if slowly. The Directors regretted that in order to meet the interest on their debentures they had been compelled to increase the Company's debt by issuing bonds. The actual increase in their revenue justified the expectation of a surplus available towards meeting this charge, but not to its full amount. The Chairman, in moving the adoption of the report, commented on it paragraph by paragraph, and made special reference to the depreciation in the value of the rouble, which had materially affected the Company. Mr. Sangster seconded the adoption of the report, which, after some discussion, was agreed to. A resolution was then passed altering the date of the meeting from August to February or March, and the retiring Directors and Auditors were re-elected.

BARNET DISTRICT GAS AND WATER COMPANY.

The Half-Yearly Meeting of this Company was held on Friday last, at the Guildhall Tavern, Gresham Street—J. F. Bontems, Esq., in the chair.

The Secretary (Mr. Alfred Lass) read the notice of meeting, and the following report and statement of accounts were taken as read:—

The Directors beg to submit to the Proprietors the accounts for the half year ending the 30th of June last, which show the financial position of the Company.

The balance of the profit and loss net revenue account amounts to £2210 12s. 1d., out of which the Directors recommend the declaration of a dividend for the half year ending the 30th of June last, at the rate of £4 15s. per cent. per annum on the A stock and shares, and £3 15s. per cent. per annum on the B stock.

The gas-rental for the last half year has amounted to £3747 10s. 6d., which shows an increase of £214 8s. 6d. on the corresponding period of last year. The water-rental has amounted to £2218 11s. 8d., and shows on the same period an increase of £346 6s. 9d.

The Directors regret to have to announce the death of Mr. Edward Beckwith, one of the Auditors of the Company.

The dividend, if sanctioned, will be payable on the 17th of September next.

Dr.—*Gas Revenue Account, for the Half Year ending June 30, 1878.*

To Manufacture of gas—			
Coals	£1347 7 3		
Purifying	54 6 9		
Wages	237 7 3		
Repair and maintenance, works and plant	220 19 5		
Salaries of Engineer, &c.	116 13 4		
		£1976 14 0	
Distribution of gas—			
Salaries—Inspector and Clerks	£127 5 0		
Repair and maintenance, mains and services	81 16 3		
Repairing and renewing meters	76 7 8		
		285 8 11	
Public lamps—			
Lighting and repairing	£74 3 5		
		74 3 5	
Rent, rates, and taxes—			
Rent	£2 16 8		
Rates and taxes	108 10 0		
		111 6 8	
Management—			
Directors allowances	£100 0 0		
Salaries—Secretary and Accountant	100 0 0		
Collector's commission	82 3 10		
Stationery and printing	43 8 6		
General establishment charges	68 18 0		
Auditors fees	5 5 0		
		400 0 4	
Law charges		6 19 10	
Bad debts and allowances		20 13 2	
		£2875 6 4	
Balance to profit and loss account, net revenue		1697 13 6	
		£4572 19 10	

Cr.—*Gas Revenue Account.*

By Sale of gas—			
Private rental	£3441 19 3		
Public lighting	305 11 3		
		£3747 10 6	
Rental of meters		100 14 11	
Residual products—			
Coke	£546 16 3		
Breeze	22 0 3		
Tar	96 11 0		
Sulphate account	34 11 11		
		699 19 5	
Rent account		24 0 0	
Miscellaneous receipts		0 15 0	
		£4572 19 10	

Dr.—*Water Revenue Account.*

To Coals	£362 2 6		
Wages	171 11 6		
Repair and maintenance, works and plant	201 2 8		
Salaries—Inspector and Clerks	24 8 11		
Repair and maintenance, mains and services	101 9 1		
Salaries of Engineers, &c.	58 6 8		
		£919 1 4	
Rent	£25 8 4		
Rates and taxes	54 5 0		
		79 13 4	
Directors allowances	£50 0 0		
Salaries—Secretary, Accountant, &c.	50 0 0		
Collector's commission	41 4 5		
Stationery and printing	21 14 2		
General establishment charges	34 9 0		
Auditors fees	2 12 6		
		200 0 1	
Law charges		35 17 10	
Bad debts		17 18 4	
		£1252 10 11	
Balance to profit and loss account, net revenue		994 3 3	
		£2246 14 2	

Cr.—*Water Revenue Account.*

By Sale of water	£2218 11 8
Rents	28 2 6
	£2246 14 2

Dr.—*Profit and Loss Account, Net Revenue.*

To Dividend paid to Shareholders for the half year ending Dec. 31, 1877	£2044 1 11
Income-tax	96 7 9
Interest on loans and mortgage bonds to June 30, 1878	549 4 6
Interest on temporary loans and moneys received in anticipation of calls	218 19 7
Balance available for dividend for the half year ending June 30, 1878	2210 12 1
	£5119 5 10

Cr.—*Profit and Loss, Net Revenue.*

Jan. 1, 1878—	
By Balance brought from last account	£2347 11 5
June 30, 1878—	
Revenue account, gas	1697 13 6
Revenue account, water	994 3 3
Fitting account	79 17 8
	£5119 5 10

The Chairman: Gentlemen, I need scarcely say anything to you because, if you have read the report and looked through the figures of the accounts, you know almost as much about them as I do; but having called you together, I suppose you will expect the Chairman to say a few words on any subject that may strike him as being interesting to you. I looked through the accounts myself this morning, and jotted down a few things that I thought I might speak about very shortly. What occurred to me as being the first thing in your estimation was the question of dividends. I dare say you would have liked a little larger dividend this half year, as I am sure the Directors would, but the figures show that we could not prudently give you more. At the same time we are consoled by feeling that this half year is rather the smaller of the two for receipts, and, therefore, perhaps we may be satisfied with the same amount as last half year, and look hopefully to the next for a little improvement. Of course we all know the reason why our dividends are smaller than those of other gas companies. Our capital is larger in proportion to our receipts than the capitals of most companies, and our district is very extensive; the houses are few and far between, so that we have to expend a great deal of money in laying down mains for the supply, which produce at present but a small return, but which will by-and-by pay very handsomely. Then, again, we must never forget that we had three small plants which are being turned into one larger plant, and the process of doing this is costly. We foresaw this, for I remember that I myself, from the chair, when we agreed to the amalgamation, cautioned you that you must expect your dividends to be a little interfered with during the construction of the larger plant, and until the supply of the district was provided for. I have no doubt that whoever lives to see that time, will find that he is rewarded for his patience. I have looked through the expenses, because some of our friends generally examine them closely, and sometimes question us about them. There is a little increase in the expenses compared with the last half year, because we have raised the salaries of our Engineer and our Secretary. They are both of them excellent officers, but they have been paid so very moderately, that we felt bound in our own interest to pay them a little better. Then again, our friends, the Local Authorities, whatever else they do for us, always take care to keep up our rates and taxes, and we have had a little of their work lately exercised upon us. Then we have done that of which I think you will approve—we have paid attention to our meters. We have bought a great many new meters, and thoroughly repaired some old ones, and we intend to pursue that course until we have a capital supply of meters all through the district. The expenditure upon works is an important consideration for us. The feeling of the Board is now, and always has been, that we must try to do our duty by the district, while, at the same time, taking into consideration the already heavy expenditure of capital, and desiring not to spend more than is really necessary for the progress of the works and our own ultimate success. The sum expended on works for the gas department is but small—£235; the sum expended for the water department is large—£4321; but I think it has all been well spent in laying new mains, or removing small old ones and putting down larger. That expenditure must be productive of advantage to the Company in the future. There is another matter that we hear talked about still, and I suppose shall continue to—namely, the reduction of the charge for the gas. I think that no reasonable person could expect that we should reduce the price while we pay so small a dividend, without some very clear proof that we should thereby greatly extend our custom. I am glad to find that there are some reasonable people in the district. Occasionally I see a remark made in the newspapers by a reasonable person to the effect that the public cannot fairly expect us to reduce the price under present circumstances, but I am afraid those reasonable people are few, and that a great many people in the district expect to be supplied with good gas and excellent water by other persons capital, without giving a proper return. I hope the number of reasonable people will increase as time goes on, but we must have patience, and wait until that is the case. I do not know whether any of our shareholders have turned their attention to the electric light, but I have. I see that in London there is some weakness manifested in the price of gas shares, on account of what has been said and written about the electric light. I have made inquiry, and have listened to what has been said by people who are very good authorities upon the subject, and I do not think, even in the Metropolis, there is much fear of any injury being at present inflicted upon gas shareholders by the electric light. We do not know what improvements may take place, but whatever may happen in London, I think it will be a long time before the hills and valleys of North Middlesex are lighted by the electric light. I do not think we need have much fear of any harm coming to us in that direction. With these few remarks, I beg to move the adoption of the report and balance-sheet.

Mr. Glaisher said he had great pleasure in seconding the motion, more especially because, in the less profitable half year, the Company were able to pay the same dividend as that which was paid in the previous six months. This fact was itself a proof of progress, and held out hope for the future. The Chairman had referred to the electric light, and he himself had naturally taken great interest in the probable effect of that light upon gas property. He had seen it at Havre and in Paris, and when it was considered that a 70-horse power engine was required for about 16 lights, he thought it would be acknowledged that the expense was so great, that it would be a long time before the electric light could come into general use, even for large spaces. In 1851 he was one of the jurors at the International Exhibition, and the electric light was then brought under his notice. Comparing what was then done with what could be done now, there certainly was progress, but very little considering the number of years that had since elapsed; and, although the price of gas shares had gone down in the market, he was convinced that, unless the progress was much greater in coming years, those shares would resume their normal value, and dividends would not be affected. The Chairman had alluded to the Local Authorities. Of course, it was to the interest of the Company to work harmoniously with them, and it was a matter for deep regret when any circumstance arose to create a difference. The interest of the Local Authorities was the same as the Company's interest, and he hoped that, as time went on, this would be clearly understood.

The resolution was agreed to.

The Chairman moved—"That a dividend for the half year ending June 30, 1878, be declared at the rate of £4 15s. per cent. per annum on the A stock and shares, and £3 15s. per cent. per annum on the B stock, free of income-tax, and that the same be payable on the 17th of September next."

Mr. Glaisher seconded the motion, which was agreed to.

The Chairman next moved—"That the 1850 fully paid-up shares of £10 each, forming part of the original capital of the Company, be converted or consolidated into general capital A stock of the Company, such stock to be divided amongst the holders entitled to the said shares, according to their respective interests therein." He said most of the Shareholders were conversant with the nature of gas shares and stock, and knew the advantages which resulted from the conversion of shares into stock. It greatly simplified the accounts, and made the Company appear more consolidated. At the wish of some of the Shareholders, the Board applied to the Stock Exchange Committee to have their shares quoted, and one of the objections made at that time was that the shares had not been turned into stock. The present proposal would, therefore, be one step in the direction of getting a quotation, though probably they would have to wait until the capital of the Company was larger. He was not aware of any inconvenience that would be caused by the conversion, while it would undoubtedly be a convenience to the Company. Mr. Slaughter, the Secretary of the Stock Exchange, in reply to an application for a quotation,

said, "I venture to recommend the withdrawal of the application, feeling almost certain that, in the divided condition of the capital, the Stock Exchange Committee will not be inclined to grant a quotation."

The motion was seconded by Mr. GLAISHER and agreed to.

The CHAIRMAN expressed the regret which he felt at having to announce the death of one of the Auditors, Mr. Beckwith. The accounts had been audited by the remaining Auditor, and, as the Directors had not received official intimation of the death until after the time had expired for giving notice to the Shareholders, it became a question whether they should recommend the appointment of another auditor that day, or wait until the next meeting, by which time due notice could be given. However, having regard to the fact that the remaining Auditor was unfortunately unwell, they had thought it better to have the vacancy filled up at once, if the Shareholders thought fit to do so. Two gentlemen had written to the Board making application for the appointment. They had been informed that the matter rested entirely with the Shareholders.

The SECRETARY read the two applications which had been received—one from Mr. M. Ohren, Secretary of the Crystal Palace Gas Company, and the other from Mr. John Johnson, of The Gaslight and Coke Company.

Mr. KNIGHT thought it better that the election should be left open till the next meeting.

Mr. NEWTON expressed the same view, and, as this met with the approval of the meeting, the vacancy was not filled up..

Votes of thanks to the Secretary, the Engineer, and the other Officers of the Company were agreed to, and the proceedings terminated with the usual compliment to the chair.

TOWN AND COUNTY OF POOLE GAS AND COKE COMPANY.

The Ordinary Half-Yearly Meeting of this Company, followed by an Extraordinary General Meeting, was held on Monday, Aug. 12—Mr. W. PEARCE in the chair.

The SECRETARY (Mr. J. Budden) read the notice convening the meeting, and the following report was presented:—

The Directors, during the last half year, have continued the work of taking up the small mains laid down at the commencement of the Company's operations, and replacing them by others of a larger calibre, the original mains having become insufficient for present purposes. When the Directors first took this work in hand, they did not consider it expedient to have it all done at once, but rather to proceed with it gradually by their own workmen, doing that which was most urgent first, and the other as any suitable occasion offered. It has, therefore, been on hand some time, but the Directors think that they are now justified in saying that there will not be much further expenditure under this head.

The Directors have also, with a view to carrying on their operations for the future with all the modern appliances now used in the manufacture of gas, and to making an extensive enlargement of their works to meet the yearly increasing consumption, entered into contracts for the erection of a new steam-engine, with exhausters, condensers, scrubbers, pumps, &c.; they have also constructed a large tar-tank, and a new brick building for the works. All these works are now in course of construction, some of them being nearly complete at the present time.

The Directors were advised that these additions to the works were not only necessary to enable the Company to maintain the illuminating power and purity of the gas supplied by them, in accordance with present usage, but that they would amply repay the cost of construction, by producing a larger volume of gas from a given quantity of coal than has hitherto been practicable under the present arrangements, besides making the residual products more valuable. Hitherto the Company have never been able to dispose of the ammoniacal liquor, but the Directors expect to be able, under the new arrangements, to dispose of it with advantage.

It is one of the features of a gas company, and one of its advantages also, that the works are always requiring enlargement to provide for an increased demand. In making these enlargements, it is neither practicable nor desirable to maintain at all times the same proportion between the capabilities of the works and the average yearly consumption. The arrangements, when first made, must of necessity be largely in excess of the quantity actually supplied at that time, but as year by year the consumption increases, the increased quantity is supplied without any further outlay, except for a few additional retorts, until it becomes again more than the works, enlarged as they are, can provide, and then further enlargements have to be made in the same way.

In the case of this Company there had not been any general enlargement of the mains and plant for very many years; it had been put off from time to time until it was not possible to delay it any longer—hence a much larger outlay has been required, on the present occasion, than would otherwise have been necessary had proper enlargements been made from time to time when required.

When these additions to the works are complete, the plant will be capable of providing almost double the quantity it is now doing, without incurring, except as before mentioned, any additional outlay, and as this process goes on year by year, both the Proprietors and the Public derive a benefit from it.

When these additions are disposed of, the Directors propose, with the sanction of the Proprietors, to build a new office, with a board-room, and also a coal store. The present office is not only insufficient for the Company's business, but its floor being below the water-level, it is at times very damp and unwholesome; while the site could be applied to a much better purpose, by being used for the ordinary manufacturing operations, and the office placed on the new land recently purchased by the Company.

The accounts show that during the last half year there has been taken out of the unexpended capital brought from the last account, in part payment of these works, a sum of £385 7s. 10d., which only leaves a balance in hand of £443 17s., and this the Directors think will, with a further sum of £2000, after taking credit for £250 for old apparatus, all be required to complete the works proposed.

The Directors will, therefore, at a later stage of the proceedings, have to submit to the Proprietors a resolution to authorize the raising of a further sum of £2000.

The Directors feel much regret in being called upon to state that their anticipations with regard to the loss of gas by leakage have not been realized; but that the loss which in the Christmas half year had been reduced to 16½ per cent., and which they fully expected to have further reduced this half year, has, on the contrary, much to their disappointment, increased from 16½ to 24¼ per cent.

The Directors are much troubled by this unforeseen occurrence, especially as the remedy is not immediately obvious; but they assure the Proprietors that the matter shall not be allowed to sleep, but be followed up until the defect is in some way or other discovered and remedied.

The gas consumed in this half year has been 5,759,700 cubic feet, as against 5,350,500 in the corresponding half of 1877, whilst the coals used in the corresponding half year, for the lesser quantity of gas, were 826½ tons as against 796 for this half year with the larger quantity.

The average price of coal brought into the Company's stores, all charges included, was in the corresponding half year 16s. 1d., and in the present half year 15s. 3½d.

The coke produced for sale has been well up to the average, both in quantity and quality, but it has not been possible to dispose of it on such favourable terms in the last half year as in the corresponding half year. It has, therefore, been estimated in the revenue account at 14s. instead of 15s. as heretofore, and as there is a large stock in hand at the present time, it may, in the next half year, have to be estimated at something less than this.

The tar has been sold slightly in excess of the value estimated in the revenue account.

The Directors consider that these results, with the exception of the loss by leakage, are satisfactory, and that but for the leakage the profit for the half year would have been sufficient in itself, as anticipated in the last report, to have paid the maximum dividend; as it is, however, the profit must for this purpose be supplemented by a further draught from the reserve-fund.

This will leave but a very small balance for future casualties, but still the Directors think they are justified in recommending that a dividend at the rate of 10 per cent. per annum on the A shares, and at the rate of 4 per cent. per annum upon the B shares, be paid.

The CHAIRMAN moved—"That the report of the Directors, and the accounts to June 30, 1878, now submitted to the Proprietors, be approved of, and entered on the minutes." He said he must make an apology for the Directors proposing to pay the full amount of dividend allowed by law, especially as they had not earned it during the half year, but had had recourse to the reserve-fund. That would not help them at their next meeting, as the Directors had decided that they must either make more profit or pay less dividend. The loss of gas by leakage was a serious matter, which could only be accounted for by the continued shifting and changing of pipes, and they had been obliged to work without a scrubber for the last two or three months. In defence, he could assure them that the Directors had used the greatest economy in every department, and it had been a constant study with Mr. Budden and himself to arrange the new works, which were absolutely necessary, to the best advantage, and the Directors had at all times been ready to give advice and assistance. The Shareholders should bear in mind that the Directors had to pay for dividends and interest at the present time upwards of £1600 a year (and they would, of course, pay more as they increased the capital), whereas under the old system it did not reach £500 per year. He was, however, sanguine that when the new condenser, scrubber, and exhauster were at work they would be able to make both ends meet, and pay over to the reserve-fund a large amount, to meet any casualty that might arise. Mr. Penney, whom he was glad to see present, in a letter received that morning, asked him if there was any chance of competing for the lighting of the public lamps. As he was a member of the Town Council, he thought they ought to get that information from him, and it was said that if one could not speak well of a body of men it was better to pass them over in silence. He had, therefore, nothing to say with regard to the Town Council and the public lights.

Mr. T. S. FURNELL seconded the motion.

Mr. W. PENNEY said he had the fullest confidence in, and respect for the Directors, who, no doubt, had done the best they could; but they themselves admitted that it was not a very satisfactory report, the great loss of gas being the chief point. If the Company lost one-fourth of their gas every year, and it cost them one-third in the manufacture, he asked whether it was not possible for them to compete for the lighting of the public lamps. He asked this for the benefit of the Shareholders, of whom he was sorry to see so few present; in fact, there were only Mr. Furnell and himself who, as Shareholders, were not either Directors or officially connected with the Company. Next, he wished to know whether the gas made was measured. They were a manufacturing company, and the principal thing they made was gas; but, although it was a simple matter, in the report there was no statement of how much gas they made. It only said what was consumed, and he wanted to ask whether the Directors could give, in their report, a statement of how much gas was made every year, whether it was all measured by meter at the works, and whether the gas consumed at the works was measured and charged as well as the expense of manufacture. The Chairman had already answered the question as to the loss of gas. Lastly, it seemed to him that, instead of taking from the reserve-fund during the past year, they ought to have increased it. He almost questioned—although he would not move an amendment—whether the Directors were justified in recommending a dividend of 10 per cent.

The SECRETARY said all the gas that was made was measured by the station-meter, but the gas consumed on the works was not measured by a separate meter; it was included in the unaccounted-for gas. They had been working for the last three months without a scrubber, and with only a piece of a condenser, before they had the new condenser erected. The consequence was that, as Mr. Penney, being a chemist, knew, the coal gave up, not only gas, but vapour, and a large portion passed through the station-meter, and was measured as gas. This made the unaccounted-for gas much larger than would be the case if they were working with effective apparatus, when he believed the loss would not exceed 12½ per cent.

Mr. STONE said that was too much; it ought to be between 8 and 10 per cent.

The CHAIRMAN said they had gone back during the last half year; but they had greatly improved on the old system, when the loss of gas amounted to 30 per cent. They now made 9600 feet of gas out of every ton of coal, whereas they formerly made only from 7000 to 8000 feet. He thought the Directors should say something in their defence. The improvements that had been made had cost the Directors a great deal of trouble, for they had done without a Gas Engineer or an Architect, and they had tried to be as economical as possible. He was sure that Mr. Budden had given his time, and had been most useful in carrying out the undertaking. Very few gas-works would have gone on as they had, without a Gas Engineer, but they had saved that expense. They had taken up almost every service-pipe in the town, and they could not wonder very much that they should have nearly the present amount of waste.

Mr. PENNEY wished to ask, with regard to the amount transferred from the reserve-fund, if it was correct for the Directors to do this without the sanction of the Shareholders.

Mr. BRINE said it was perfectly within the power of the Directors to withdraw money from the reserve-fund, and it was done every day by other companies.

Mr. STONE said during the time that coal was so dear, all gas companies had to do this in order to make up dividends.

The motion was then carried unanimously.

The CHAIRMAN moved, and Mr. PENNEY seconded, the motion for the payment of the dividends recommended by the Directors, and this was agreed to.

The extraordinary meeting, to consider a proposition for raising additional capital, was then held, when Mr. MILLNS moved, Mr. GUTCH seconded, and it was resolved—"That the Directors be authorized to raise from time to time (as and when it may be required) a further sum or sums of money, not exceeding £2000, by the creation and issue of debenture bonds of £50 each, and at a rate of interest not more than 5 per cent. per annum."

Mr. PENNEY proposed a vote of thanks to the Chairman, the Directors, and the Secretary for the manner in which they had conducted the affairs of the Company during the last half year. He said he had the greatest pleasure in moving this resolution, because, although he could not agree with everything in the report, the Directors had worked very well, especially in making arrangements for improving the works, so that they might have a larger supply of gas from the same quantity of coal. They had given a great deal of time and thought to this object, but he should be glad if, in their next report, they would tell the Shareholders how much gas was actually made, and what was used on the premises; also how much money was derived from the sale of coke and ammoniacal liquor.

Mr. FURNELL seconded the proposition, which was carried unanimously.

The CHAIRMAN and the SECRETARY returned thanks. The latter mentioned that the amount of gas manufactured during the past year was 15,409,000 feet, the quantity sold or consumed at the works was 12 million feet, showing a loss of 3,409,000 feet.

The proceedings then terminated.

FAVERSHAM GAS COMPANY.—At the annual meeting of this Company—Mr. W. E. Rigden in the chair—a dividend of 10 per cent. was declared, with the addition of a bonus of £2 on each share. The Directors and Auditors were re-elected, and a recommendation to reduce the price of gas to private consumers to 4s. per 1000 feet, subject to a further reduct on of 3d. per 1000 for prompt payment, to take effect from the 1st of July last, was adopted. It was further resolved that the charge for lighting the public lamps be also reduced.

SOUTH SHIELDS GAS COMPANY.

The Half-Yearly Meeting of the Shareholders of this Company was held last Thursday—ROBERT WALLIS, Esq., J.P., in the chair.

The SECRETARY (Mr. J. H. Penney) having read the notice convening the meeting, the following report of the Directors was taken as read:—

Your Directors have great pleasure in presenting the report, with the accounts and balance-sheet of the Company, for the past half year.

The result of the working for the half year has been satisfactory. Notwithstanding the reduction of 3d. per 1000 in the price of the gas, there is sufficient profit to enable the Company to pay the usual interim dividends of 4¼ per cent. on the A stock, and 3½ per cent. on the B stock and subscribed new capital, and carry forward a balance of £125 4s. 9d.

The section of the new works at Jarrow is fast approaching completion, and will be in operation this coming winter.

Your Directors have, in the erection of the Jarrow works, fully taken into their consideration the probable increase in the use of gas in the district, and have made their arrangements accordingly, by purchasing a site of ground, with valuable river frontage, for any further extension of the works.

The Directors deem it advisable to indicate to the Shareholders the necessity of applying to Parliament next session to obtain further powers.

DR.—*Half-Yearly Profit and Loss Account, ending June 30, 1878.*

To Balance from Dec., 1877		£2,687 17 7
Transfer from reserve-fund		87 11 7
		£2,775 9 2
Half year's gas and meter rental (net)		£11,217 2 11
Sale of coke		1,040 7 4
Ditto tar		597 11 8
Profit on ammonia		576 4 11
Corporation upholding public lamps during half year		411 14 3
Service charges, fixing meters, &c.		54 16 3
Rents from property at Jarrow		1 13 0
Stock of coals, coke, tar, iron, and sundries		1,698 6 4
Transfer fees		1 10 0
		£15,599 6 8

CR.—*Profit and Loss Account.*

By Dividend on A stock		£1,800 0 0
Do. B stock, and new calls		975 9 2
		£2,775 9 2
Stock of coal, coke, tar, &c., from 1877		£1,809 18 3
Coals and cartage		3,090 3 2
Wages and superintendence		2,971 15 10
Salaries (Office)		257 10 0
Do. (Collectors)		120 0 0
Rents		8 5 4
Rates		518 19 11
Directors, Auditors, and Scrutineers fees		147 0 0
Lime		147 18 3
Water		65 3 3
Retorts, bricks, &c.		328 6 10
Service-pipes, gas-cocks, iron, steel, and tin goods		431 15 8
Castings		91 1 0
Cartage		213 10 3
Paving		21 11 6
Stationery, printing, &c.		43 11 9
Incidentals and miscellaneous		367 3 1
Paints, oils, &c.		65 0 10
Wear and tear—maintaining and relaying mains, &c.		790 16 9
Bad debts		27 15 3
Interest on loans, &c.		599 1 0
New meters		143 11 10
Repaired meters		43 6 3
Repairs		72 0 1
Law expenses		247 3 8
Balance to profit		2,976 16 11
		£15,599 6 8

DR.—*Balance-Sheet.*

To Proprietors capital (A stock)	£40,000 0 0		
Do. (B ,,)	20,000 0 0		
Do. (New)	11,476 0 0		
		£71,476 0 0	
Loan capital, mortgages, and bonds		19,300 0 0	
Revenue account, balance of profit		2,976 16 11	
Sundry accounts owing for coals, lime, iron goods, &c.		1,842 17 4	
J. & E. Joicey, for land and quay	£6,500 0 0		
Less deposit of 10 per cent.	650 0 0		
		5,850 0 0	
Deposits for gas		1,086 16 5	
Reserve-fund	£6,281 0 2		
Dividend on £5811 15s. 3d., invested in 3 per cent. Consols	92 10 2		
		6,373 10 4	
		£108,906 1 0	

CR.—*Balance-Sheet.*

By Plant, works, &c., as per last statement	£62,655 16 11		
Extensions and new mains during half year	611 5 2		
	£63,267 2 1		
Less wear and tear—maintaining and relaying mains, &c.	790 16 9		
		£62,476 5 4	
New works in progress at Jarrow		23,134 17 0	
Land and quay	£6,500 0 0		
Less old material sold	1,154 5 7		
		5,345 14 5	
Horses and carts	£832 9 6		
Less profit	472 3 7		
		360 5 11	
Stock of horses food	£11 16 6		
Do. acid	10 16 0		
Do. coals, coke, tar, &c.	1,698 6 4		
		1,720 18 10	
Consumers gas accounts, inclusive of quarter due this day		6,179 17 7	
Sundry accounts owing for coke, tar, &c.		2,163 6 5	
Reserve-fund invested in 3 per cent. Consols		5,811 15 3	
Balance with bankers	£1,627 7 11		
Bills receivable	4 9 4		
Cash in hand	81 3 0		
		1,713 0 3	
		£108,906 1 0	

The CHAIRMAN: Gentlemen, I have really no remarks to make. This is our interim half-yearly meeting, and any speech I might have to make had better, perhaps, be made at the general meeting. I think the report gives all the information you require; but if any Shareholder has anything further to ask, the Directors or myself will be most happy to answer any question put. I have simply to move that the report and accounts, certified by the Auditors and circulated amongst the Shareholders, be taken as read. That being agreed to, I have next to move that the report and accounts now submitted to the meeting be received and adopted.

Mr. R. CHAPMAN seconded the motion, which was carried.

Mr. W. ANDERSON then moved that an interim dividend of 4¼ per cent. on the A stock, and 3½ per cent. on the B stock and subscribed new capital of the Company, be paid on the 5th of September next. He said there had been great depression in business, and if they could maintain their dividends it was as much as they could expect.

Mr. J. L. HALL seconded the motion, which was carried unanimously.

Mr. R. VINT moved a vote of thanks to the Directors for the care they had taken in conducting the affairs of the Company. He said he had great pleasure in moving the resolution, especially in his native town. This was the first time he had had the pleasure of meeting the Shareholders, and he was glad to know the Company were in such a prosperous state.

Alderman GLOVER seconded the motion, and also alluded to the prosperous state of the Company.

Mr. J. ROBINSON responded on behalf of the Directors, who, he said, were anxious to do all they could for the benefit of the Company.

The MAYOR (Mr. Dale): I think there is one duty we ought to fulfil, and it is a pleasing duty to me. It is to propose that the best thanks of this meeting be given to the Chairman for the able manner in which he has conducted, not only this meeting, but all previous meetings I have had the opportunity of attending. I am sure every one here will be quite sensible of the great advantage he is to the Company; and the long connection he has had with it, and the experience he has had, all justify us in thinking he is a very able and excellent Director. There is one fact which I think tells most favourably for the Company, and which has been pointed out to me—that is, that the bad debts only amount to £27. Now, I think in a large Company like this, where a considerable sum of money is turned over, to have only £27 of bad debts in times which are not extremely prosperous, as at the present, is, to say the least of it, a gratifying circumstance.

Mr. W. HENDERSON seconded the motion, which was carried.

The CHAIRMAN, responding, said that in more troubled times the conduct of their business was a matter of anxiety; but things had gone quietly and smoothly for so many years that his duties were now merely formal at these meetings; and he had such an efficient and unanimous staff of Directors that he had a very easy time of it.

The meeting then terminated.

BRIGHTON GASLIGHT AND COKE COMPANY.

The Ordinary Half-Yearly Meeting of the Proprietors of this Company was held on Thursday last, at the London Office, Moorgate Street Chambers, E.C.—Mr. J. MILES in the chair.

The following report was presented:—

There has been a fair increase in the demand for gas during the past six months, but the Directors are unable to report any improvement in the price of coke.

The ordinary annual repairs and renewals have been proceeded with, and some changes, calculated to increase the efficiency of the works, are in progress.

The Directors recommend the declaration of a dividend on the paid-up capital of the Company of 5 per cent. for the half year ending the 24th of June last, less income-tax; the same to be payable on and after the 9th of September.

Some months since, a very destructive explosion of gas took place in Brighton, doing a great amount of damage not only to the contents of several shops, but to the houses themselves. A steam-roller employed by the Corporation caused a leakage from a water-main; the escaping water undermined a 6-inch gas-main belonging to this Company, which, thus deprived of its proper support, was fractured by the ponderous machine, with the disastrous results alluded to. The insurance offices, heavily affected by the various interests involved, took up the question of liability, and a series of actions was commenced against the Corporation. One of these, as a test action, was tried before a special jury, who gave a verdict for the plaintiff, thus completely exonerating the Gas Company from blame. The case has throughout been closely watched by the legal advisers of the Company, and, though some expense has been thereby incurred, the Directors cannot but congratulate the Shareholders on so satisfactory a termination to an occurrence disagreeable in its nature under any circumstances.

DR. *Profit and Loss Account, for the Half Year ending June 24, 1878.* CR.

Coals	£12,470 18 1		Gas and meter rental	£21,151 10 3
Materials for purification	436 16 0		Coke, &c.	4,044 19 4
Wages	2,481 15 2		Old stores, &c.	90 18 6
Rent, rates, and taxes	395 12 5			
Salaries, Collectors commission, Directors, & Auditors	1,755 17 4			
General charges	274 12 3			
Wear and tear	1,927 1 6			
Bad and doubtful debts and allowances	150 0 0			
Balance	5,394 15 4			
	£25,287 8 1			£25,287 8 1

Balance-Sheet.

Capital	£107,800 0 0		Expended on works	£91,122 12 6
Contingency-fund	5,775 12 6		Works in progress	9,555 19 6
Coal insurance account	1,725 7 1		Meters	2,167 11 7
Dividends unpaid	2,042 16 4		Coal, coke, &c., in stock	5,271 13 0
Depreciation account	1,977 3 11		Mains, service-pipes, and general stores in stock	1,879 1 6
Tradesmen's accounts, &c., owing	1,882 1 4		Sundry debtors for gas	7,302 7 4
Balance from last half year £431 17 2			,, ,, coke, &c.	1,720 1 0
This half year, as above 5,394 15 4			Cash at bankers and in hand	8,010 7 3
	5,826 12 6			
	£127,029 13 8			£127,029 13 8

The following resolutions were passed:—"That the report of the Directors, together with the accounts as audited, be received and approved, and that the report be entered on the minutes." "That a dividend for the half year ending the 24th of June last, of 5 per cent. on the paid-up capital of the Company, be now declared; the same, less income-tax, to be payable at the offices of the Company, Moorgate Street Chambers, London, on and after Monday, the 9th of September." "That the best thanks of the meeting be given to the Directors for their attention to the affairs of the Company." "That the best thanks of the meeting be given to the Auditors for their attention to the accounts of the Company." "That the best thanks of the meeting be given to Mr. Rutter, Mr. Liddall, and the other officers of the Company." "That the best thanks of the meeting be given to the Chairman for his able and courteous conduct in the chair."

NEWPORT (MON.) WATER COMPANY.—On Wednesday, Aug. 21, the half-yearly meeting of this Company was held, under the presidency of Mr. S. Homfray. From the accounts presented it appeared that, for the six months ending June last, the gross receipts were £4649 8s., to meet an expenditure of £1881 4s. 6d. There was an amount of £2768 3s. 6d. available for interest and dividends on a subscribed capital of £98,325 19s. The Chairman moved, and Mr. Gratrex seconded, the adoption of the report and accounts, which was agreed to. On the motion of the Chairman, seconded by Colonel Lyne, it was resolved that the guaranteed interest, at the rate of 6 per cent. per annum, upon the preferential shares, due on the 30th of June, be paid, and that a dividend of 4 per cent. on the ordinary shares for the half year ending the 30th of June last, be paid, and that such interest and dividend be payable on the 7th of September. The usual votes of thanks to the Chairman and the Directors were passed.

WOLVERHAMPTON GAS COMPANY.

The Half-Yearly Meeting of this Company was held last Tuesday—Mr. JOHN UNDERHILL in the chair.

The SECRETARY (Mr. A. Jones) read the following report:—

Your Directors have great pleasure in presenting this, their 53rd half-yearly balance-sheet and general statement of accounts, duly certified by your Auditor, showing the revenue for the half year ending June 30 to be £23,513 14s., and the expenditure £18,150 8s. 5d., leaving a balance of £5363 5s. 7d., which, added to the balance of last account, amounts to £7608 12s. 7d.

From this your Directors recommend the payment of a 5 per cent. dividend upon the consolidated stock, and 3 per cent. (less income-tax) upon the paid-up capital of the preference shares, payable forthwith if approved by the meeting.

The continued increased consumption of gas, and reduction in the price of coal, will, on this occasion, justify your Directors in announcing a further reduction in the price of gas from 2s. 7d. to 2s. 6d. per 1000 cubic feet, such reduction to take effect from Oct. 1.

Your Directors beg to inform you that Mr. B. Savage has been appointed a Director in place of Mr. R. Warner, who died a short time previous to the meeting held in February last.

The usual repairs, alterations, and improvements of the works and plant, together with the erection of large scrubbers at your Stafford Road works, have been in progress during the past four months, and will very shortly be completed.

It is scarcely necessary to add, in conclusion, that your Directors will continue the same policy that has on so many occasions been approved by you, and they trust their efforts will be crowned with increased success.

The CHAIRMAN, in moving the adoption of the report and accounts, said, as the Shareholders would perceive, the revenue of the Company last half year was not quite sufficient to pay the usual dividends. That fact might impress itself somewhat unfavourably upon the minds of some present, without the explanation that the receipts for the first six months of each year were considerably less than in the remaining portion. The Directors, in declaring the usual dividend, however, considered themselves perfectly safe, knowing, as they did, that with the revenue of the last six months of the year they would have a balance of profit, over and above the amount required for dividend, more than sufficient to recoup them for what they had to draw now to make up the dividend. During the last half year a considerable amount of repairs and improvements had been going on at the works, in preparation for the coming winter, and these, when completed, would, the Directors had every reason to believe, enable them to supply the additional quantity of gas which the large and continued increase in the number of consumers required; and they also hoped that, with this increased quantity, they would be able to continue the improved quality of the gas which they had supplied to their customers for some time past. Amongst other improvements at the works they had erected some new scrubbers, which they believed would considerably improve the quality of the gas supplied, and he was also inclined to think would produce some little accession to the Company's revenue. The third paragraph in the report would, he felt sure, be generally acceptable to the general body of Consumers and Shareholders, as it was most gratifying to the Directors to announce the reduction in price. They now found themselves in the position they had been looking forward to for several years past; in fact, he might say ever since the commotion which occurred in the iron and coal trades, which led to the sudden rise in price some years back. As he had stated on previous occasions, all through that period the Directors of the Wolverhampton Gas Company were enabled, by taking a little from the reserve-fund, and also by the exercise of economy in every department, to keep up the payment of their usual dividends without any increase in the price charged to their customers, except in one instance, where they increased it 3d. per 1000 feet. The Directors had felt all along that, so soon as the reduction in the price of coal and other circumstances permitted, it would be their first duty to the public to reduce the price of their gas. He was now, therefore, very glad to tell the meeting that the time to which they had been looking forward had arrived, and that the terms on which they had made their contracts for coal, coupled with the increased demand for gas, enabled the Directors to announce a reduction from 2s. 7d. to 2s. 6d. per 1000 cubic feet. They did not think at first that they would be enabled to announce the reduction to come into operation until the end of the year, but after fully considering the matter, and being anxious to give their customers the benefit of their improved position as soon as possible, they had decided that the reduction should take effect from the 1st of October next. The rate would then be as low as either this or any other Company ever charged; in fact, he could unhesitatingly say that no other Company ever before offered to supply gas at a less rate. He might also add that taking off this 1d. per 1000 feet, coupled with the 2d. per 1000 feet which they took off some time ago, meant a reduction in the Company's revenue of £3000 per annum; so that some degree of caution was required on the part of the Directors before deciding upon these steps. But they felt sure the public would be all the better satisfied with what they had done, and that the interests of the Company would not suffer by the concession. Another subject which the Directors had had under their consideration was that which was causing so much disturbance amongst gas proprietors throughout the country—the electric light. After making the fullest inquiries on the subject, the Directors had come to the conclusion that, considering the great expense attendent upon the production of the light, the great uncertainty as to the length of time it kept alight, and the trouble it involved to the general body of consumers, there did not appear to be any probability of its becoming a formidable opponent to gaslight for many years to come; and so long as the Company were able to produce gas in sufficient quantity, and of good quality, at so low a price as 2s. 6d. per 1000 feet, he did not believe they would have any cause to fear the operations of such a rival as the electric light.

Mr. OWEN seconded the motion, which was agreed to.

Mr. BANKS moved that the remuneration of the Directors be increased by 250 guineas. It was, he said, ten years since any alteration in the remuneration was made, and he had great pleasure in moving the addition of the sum named for the able services they rendered in the management of the undertaking.

Mr. FLEMING seconded the motion. He said he did not know what the general duties of the Directors were, but the increased labours which had devolved upon them during the last ten years, and the able manner in which they had looked after the interests of the Company, fully justified the Shareholders in what it is proposed they should now do.

The motion was carried unanimously.

The CHAIRMAN said it was quite true, as Mr. Banks had stated, that it was ten years since any addition had been made to the Directors remuneration, and the Shareholders would, perhaps, be astonished to learn that during that period the revenue of the Company had more than doubled. In addition to that, he might further mention that, owing to the success which had attended the management of the undertaking, the Directors had been enabled not long ago to issue to the Shareholders a large amount of preference capital, bearing interest at the rate of 6 per cent. As he had previously stated, notwithstanding the difficulties which they had had to encounter some few years ago in connection with the high price of coal, they had always been enabled to keep up the payment of the usual dividends; and this they hoped to do in the future. Without speaking boastingly, he might certainly say that the Directors paid an amount of attention to the undertaking such as was to be found amongst the Directors of few other companies. They had invariably two meetings a week, and, when necessary, they met more frequently. What the Shareholders had now voted them would be an incentive to them to exert themselves still further in promoting the Company's interests.

Mr. LOVERIDGE said he should like to add a few words to what the Chairman had stated. It was very gratifying indeed, on the part of the Directors, to receive from the Shareholders such an additional acknowledgment of their services, and for this reason, that it showed to the public outside the great confidence the Shareholders had in their management.

Mr. FLEEMING next moved, and Mr. BANKS seconded, a vote of thanks to the Chairman and Directors for their services during the year.

The CHAIRMAN acknowledged the compliment, and then proposed a vote of thanks to Mr. Annan, the Engineer, to Mr. Jones, the Secretary, and to the other Officers of the Company. Speaking on behalf of the Directors, he said he could certainly assert that had it not been for the able co-operation and assistance they received from the gentlemen he had mentioned, the business of the Company would not have been so successfully conducted as it had been.

Mr. IRONMONGER, in seconding the motion, said he could fully confirm what had fallen from the Chairman. No company could possess a better staff of officers, or gentlemen who paid more attention to the promotion of the interests of the Shareholders.

The motion was then put and carried.

Mr. ANNAN briefly acknowledged the compliment on behalf of himself and his colleagues, and the meeting terminated.

EASTBOURNE GAS COMPANY.

The Half-Yearly Meeting of this Company was held on Monday, the 26th ult.—Dr. JEFFERY in the chair.

The following is the Directors report:—

In presenting their report for the past half year, the Directors have to state that the power to raise an additional £10,000 by the issue of additional shares, given to them at the last ordinary meeting of the Company, on the 25th of February last, has been exercised, and a call of £5 per share made. When the remaining call has been received, the share capital of the Company will be £50,000, the maximum amount authorized to be raised under the Company's special Act of Parliament. If it should be necessary to still further increase the capital, application will have to be made to Parliament for that purpose.

As reported at the last ordinary meeting, the ever-increasing demand for gas has necessitated a very large extension of the works; the new tank has been finished, and the additional gasholder is almost completed. In addition to these, the Directors have accepted tenders from Messrs. John Aird and Sons, and the Horseley Company, Limited, for the erection of new and additional retorts and purifying houses and coal stores, and these works are now in progress. Tenders have also been accepted for new governors, scrubbers, exhausters, &c., and when all the works in hand are completed the capacity of the works will be doubled. The Directors, under the advice of their Engineer, are likewise laying down mains of an increased size in various parts of the town, which, it is trusted, will remove all complaints by consumers of an insufficient supply of gas. This work is also being executed by Messrs. Aird and Sons, under a contract.

From the accounts which accompany this report, it will be seen that the remaining call on the 1000 B shares authorized to be issued on Aug. 27, 1877, has been made, and a first call of £5 per share on the additional 1000 shares, the issue of which was sanctioned at the last ordinary meeting of the Company, and that a sum of £4592 5s. 2d. has been expended, during the last half year, on account of capital, leaving a balance in hand on that account of £9548 15s. 11d.

A comparison of the receipts and expenditure on the working account with those of the corresponding period of last year will, the Directors have no doubt, prove satisfactory, and after ascertaining the amount of assets and liabilities of the Company there is found to be a balance of £2597 14s. 11d. available for dividend, and the Directors accordingly recommend that a dividend at the rate of 7 per cent. per annum be declared and paid upon the £20,000 capital in B shares, and a dividend at the rate of 10 per cent. per annum upon the £20,000 original capital of the Company, which will absorb about £1600 of the available balance. As the dividend upon the last call made is of such a trifling amount—the date of payment being the 29th of June—it will be paid at the next division of profits.

Notwithstanding that a much larger revenue will, for the future, be required to pay dividends similar to those now received, the Directors have decided to reduce the price of gas 5d. per 1000 cubic feet, in accordance with the intimation contained in their last report, to commence from the 1st of October next, when all gas consumed after that date will be charged at the rate of 4s. 7d. per 1000 cubic feet, which will decrease the Company's receipts by about £1000 per annum.

The Directors who retire from office by rotation are Messrs. Robert Insoll, George Lenny, and William Guy, and they are all eligible for re-election. Mr. Josiah Brown also retires from the office of Auditor, by rotation, and is also eligible for re-election.

The CHAIRMAN moved the adoption of the report. He said that the meeting, though the half-yearly one, was the terminal meeting of the year. He would not detain those present long, but would glance rapidly at the paragraphs as they appeared in the report. In doing so, their attention would first be drawn to the issue of new shares to the amount of £10,000, under powers granted at the last meeting, which issue, he believed, had been made as fairly as possible, the allotment being carefully considered. The next matter was with reference to the extension of the works, consequent on the increased demand for gas. The Directors had made every effort, by a large outlay in greatly extending the works, to meet the demand, and everything had gone on smoothly. The extensions, though not complete, were in such a forward state that it was confidently anticipated they would be completed in October, and the works be in a most efficient condition. The new gasholder was ready, and only 10 feet remained for the tank to be filled. The increase in the extent and population of the town had necessitated the laying down of new mains, and although this might be some nuisance at the present season, he thought the nuisance had been kept down to a minimum, and that it was preferable to do the work now than to wait until the winter, when gas would be required for so many more hours, and when it would be impossible to work long days. New B shares had been issued to the number of 1000, a sum of £5 being called up on each share, and a sum of £4592 5s. 2d. had been expended during the half year, leaving a balance in hand of £9548 15s. 11d. on the capital account. A comparison of the receipts and expenditure would show that the condition of the Company was satisfactory, and he hoped that at the end of the next half year the Shareholders might be able to declare a dividend of 7 per cent. on the B shares, and 10 per cent. on the original shares. The next paragraph bore on the future position of the Company, having reference to the reduction in price. The Directors had at the former meeting recommended that a reduction of 5d. per 1000 feet should be made in the price of their gas, and that recommendation being approved, the new scale would come into operation from October next. The amount was, no doubt, considered small, but it would take away £1000 of receipts, or one per cent. dividend. The promise to reduce the price having been given, would be carried out, and he trusted that it would be appreciated. During the past few months the Directors had to undergo criticisms in the Press, and by the Ratepayers Associations; but those criticisms had been fair, and, as such, welcome. He hoped that the same characteristic would mark comments in the future.

Mr. T. NEWMAN seconded the adoption of the report, and the motion was carried unanimously.

The only other business consisted in the re-election of Messrs. R. Insoll, George Penny, and William Guy, as Directors, and Mr. J. Brown, as Auditor; and the adoption of resolutions fixing their remuneration at the same sum as last year—viz., £200 to the former and £12 12s. to the latter.

HARTLEPOOL GAS AND WATER COMPANY.

The Annual General Meeting of this Company was held last Friday—Mr. THOS. R. HOLMES in the chair.

The SECRETARY (Mr. T. Trewhitt) read the notice convening the meeting, and the following report was presented:—

Your Directors have pleasure in submitting their statement of accounts for the year ending the 30th of June last.

The balance of profit and loss account amounts to £15,208 13s. 4d., out of which the Directors recommend the declaration of a dividend for the last half year at the rate of 4s. 6d. per share on the original or A shares, at the rate of 3s. 9d. per share on the B shares, and at the rate of 3s. 6d. per share on the C shares—in all cases less income-tax.

The extensions at the gas-works, West Hartlepool, referred to in last report, are progressing satisfactorily. Additional scrubbers and other plant will be ready for work during the ensuing winter, and an additional gasholder will be proceeded with without delay.

Your Directors have much pleasure in reporting that they have succeeded in obtaining, during the present session of Parliament, an Act for an increase in the Company's capital to the extent of £200,000, free from any restrictions or conditions requiring special mention here, other than an obligation to offer for sale by public auction or tender all shares issued for gas purposes, and on which a premium can be obtained, and to apply such premium in reduction of the Company's capital.

The retiring Directors this year (who are eligible for re-election) are Messrs. Grey and Fisher, and the retiring Auditor is Mr. John H. Bell, who offers himself for re-election.

The CHAIRMAN, in proposing that the report be adopted, offered his sincerest congratulations to the Shareholders on the present favourable position of the Company. He said he thought it all the more gratifying in the midst of these bad times. There had not been much increase in the quantity of gas supplied, but there had been a large increase in water; and now everything might be said to be progressing well. The gas-works were worthy of a personal inspection. They were simply A 1. The demand for water was on the upward tendency, and might it so continue. As they were aware, their capital as a Company had been enlarged since the last annual meeting under their new special Act. But they were put under this proviso, that all the gas shares must be sold by public auction; the water shares, however, could be distributed amongst the existing Shareholders. He hoped that when the gas shares were sold they would realize a good price.

The resolution having been seconded by Mr. FISHER, was carried unanimously.

The CHAIRMAN moved the re-election of Mr. John Grey and Mr. William Hunter Fisher, the retiring Directors, and in so doing described Mr. Grey as one of the best Directors at the Board, and stated that he really did more work than all the other Directors put together. He also spoke of Mr. Fisher in complimentary terms.

The proposition having been seconded by Mr. SMITH, was carried without a dissentient.

Mr. GREY and Mr. FISHER briefly acknowledged their re-election.

Mr. FISHER proposed the re-election of Mr. J. H. Bell, the retiring Auditor, whose services, he said, were highly appreciated.

Mr. SMITH seconded the nomination, which was carried, the CHAIRMAN remarking that the Company very highly esteemed Mr. Bell's services, although he had filled the office of Auditor but a few years.

Mr. BELL, in accepting the office, said it was with considerable pleasure that he undertook the duties, because of the efficient manner in which he had been assisted by his senior colleague, who, from his lengthy experience, managed at all times to grasp the whole business, and could check the accuracy of the accounts to a farthing in many ways.

A vote of thanks to the Chairman concluded the proceedings.

ROCHESTER AND CHATHAM WATER-WORKS COMPANY.

The Half-Yearly Meeting of this Company was held on Tuesday, the 20th ult.—Mr. J. BAIRD in the chair.

The SECRETARY (Mr. Heckford) read the following report:—

In presenting the balance-sheet and accounts of the Company for the half year ended June 30, 1878, the Directors have again much pleasure to report the continued satisfactory progress of the Company, the receipts for the past half year showing an increase of £479 9s. 3d. over that of the previous one.

After providing for the usual dividend, the Directors have the gratification to announce that they have been enabled, out of the balance of profits, to carry the sum of £700 to the credit of the reserve-fund for contingencies, which fund now amounts to £6895 16s. 5d. The Directors recommend that a dividend at the rate of £7 per cent. per annum (free from income-tax) be declared upon all shares for the half year ended June 30, 1878; and that the sum of £1206 6s. 3d., the balance of the revenue account, be carried forward to the next half year's account.

The Company's Engineer reports that the quantity of water required is constantly and steadily increasing to meet the demand for extension of the district, road-watering, &c., and that the large well engine is only equal to lifting the water from the old well about 120 feet deep. The water will now have to be raised from the increased depth of 150 feet from the new well, and, looking forward to the increase in the demand for water supplied by the Company, he strongly recommends the Directors to provide an additional and larger engine and pumps without delay, both to meet future requirements, and to place the works on a more secure footing than at present.

The Directors are, therefore, making arrangements for providing another pumping-engine of the best description, which will be calculated to lift a much larger quantity of water from the increased depth, with, they are assured, a considerable reduction in the consumption of fuel, and they hope that the new engine and pumps will be ready for working early next spring.

The CHAIRMAN, in moving the adoption of the report, remarked on the satisfactory increase in the revenue of the Company during the past half year, which enabled the Directors, after placing a further sum of £700 to the reserve-fund, to pay a dividend of 7 per cent. The Directors had decided to erect additional powerful machinery, so as to provide for the rapidly increasing consumption of water, and also to lay down additional mains in order to supply the Government convict establishments at Borstal. Had not the Directors decided on this course, and also set aside a large sum to be added to the reserve-fund, the profits of the Company would have justified them in paying to the Proprietors a dividend of 10 per cent.

Mr. MOSS seconded the adoption of the report, which was agreed to.

On the motion of the CHAIRMAN, seconded by Mr. FOSTER, a dividend at the rate of 7 per cent. per annum was declared.

Mr. WARNE, in proposing a vote of thanks to the Directors, remarked that he felt sure the way in which the affairs of the Company had been managed had given entire satisfaction to the Shareholders. Looking back for 21 years since the Company had been started, it was found that, from very small beginnings, the concern had been developed to its present position entirely through the energy of the Directors. The Company had now a revenue of something like £11,000 per annum, and, after placing £700 to the reserve-fund, which now reached between £6000 and £7000, they were enabled to pay a dividend of 7 per cent. Looking at all the circumstances, he ventured to assert that the present position of the Company was almost unparalleled in the history of Water Companies. The Directors were deserving of the heartiest thanks of the Shareholders, but to his mind the time had arrived when they should do something more than merely record votes of thanks to them. Some few years ago he had proposed to the Proprietors that they should recognize the services of the Directors by voting them a payment of 100 guineas per annum, and the Shareholders unanimously adopted his recommendation—not as payment for the Directors services, but as showing an appreciation of the way in which they had conducted the Company's affairs. Considering the position to which the Company had now attained, it became a question whether they should not increase this amount, and he proposed that the thanks of the Shareholders be given to the Directors, and that the sum to be voted them be increased from 100 guineas to 200 guineas per annum.

Mr. TAYLOR seconded the motion, which was unanimously adopted.

The CHAIRMAN, on behalf of the Directors, thanked the Shareholders for the confidence reposed in them, and assured them that the Board would continue to do all in their power to promote the prosperity of the Company. He then proposed a vote of thanks to the Officers of the Company, and remarked that the Directors considered that the Secretary, upon whom a considerably increased amount of work was yearly accruing, should have his salary increased from £250 to £300 per annum.

Captain BROCK, the Vice-Chairman, seconded the proposition, and in doing so bore testimony to the valuable services of the Secretary, whose salary would have been raised by the Board had the power to do so rested with them.

The proposition was agreed to *nem. con.*

The SECRETARY thanked the Shareholders for their mark of confidence, and assured them that his and the other officers best services would always be at the disposal of the Company.

Mr. BOLTON then proposed a vote of thanks to the Chairman. He said he could heartily endorse all Mr. Warne had told them respecting that gentleman, and was satisfied that had it not been for his indomitable perseverance the Company must have collapsed at an early period. The Chairman had, however, handsomely come forward and relieved the Directors from all anxiety, and from that time the Company had continued to prosper. He had worked day and night for the Company without fee or reward, and it was impossible for the Shareholders to make any adequate return to him. To show, however, that they were not unmindful of his services, he proposed that the sum of 100 guineas be voted to him.

Mr. FOSTER seconded the motion, which was supported by the TOWN CLERK, Mr. BEAR, and Mr. WILDISH, the latter gentleman remarking that the proposal would give the greatest satisfaction to the whole body of Shareholders.

The CHAIRMAN said the proposition had taken him quite by surprise, and he would much rather the matter should be deferred until the Shareholders received 10 per cent.

Mr. BOLTON, however, refused to withdraw his proposition, which, on being put to the meeting, was unanimously adopted, and the meeting terminated.

STOCKTON AND MIDDLESBROUGH WATER-WORKS COMPANY.

A Meeting of the Shareholders of this Company was held at Darlington last Wednesday. Mr. H. PEASE, the Chairman of the Board, presided, and the following report was presented:—

The Directors beg to report to the Shareholders that on the 2nd of July last the sum of £800,000 was paid over by the Corporations of Stockton and Middlesbrough, and the undertaking of the Company was on that day transferred to the Stockton and Middlesbrough Water Board.

At that time the precise amount of the Company's debts was not ascertained, and has not even yet been ascertained.

The Directors at once proceeded to pay to the Shareholders the sum given by the Act of Parliament—namely, £466,175, in the proper proportions, according to the different classes of shares held by them.

Nearly all the statutory and other debts, so far as is known, have also been paid, and the Directors now propose to make a further payment to the ordinary Shareholders on account of the awarded sum of £213,802.

After the payment now proposed to be made, there will be left a small sum in hand, but as there must necessarily be certain unavoidable expenses connected with the winding up of the Company, the final distribution to the Shareholders must, therefore, be deferred for a short time longer.

The CHAIRMAN said the Directors now intended to make a final division of £13 10s., to be paid on the 2nd of September, and this would leave a small balance to be hereafter appropriated or divided.

Some remarks were made by the holders of preference stock, to the effect that they considered they had a claim on the funds; but they were informed that, according to the terms of the award, the Directors had no option in the matter, having already paid the holders of preference stock all that they were entitled to.

Mr. E. L. PEASE moved—"That the thanks of this meeting be and are hereby given to the Chairman and the other Directors for their long and valuable services to the Company; and in further recognition of such services, the following gentlemen are hereby appointed a Committee, with authority to vote a sum not exceeding £1500 to the Directors out of the unpaid purchase-money, as they may decide, the Directors to apportion the sum so voted in such manner as they may deem best. This meeting would, however, wish especially to recognize the able and courteous manner in which Mr. Henry Pease has for so many years filled the position of Chairman, and also the arduous labour and unremitting attention given by Mr. John Hardcastle Bowman in connection with the Company's applications to Parliament, and the recent arbitration in settlement of the amount to be received for the Company's undertaking."

Mr. ALLISON seconded the motion, which was unanimously agreed to.

Mr. BOWMAN, on the part of the Directors, acknowledged the vote, and returned thanks for the complimentary references to himself. He remarked that the Company had not received from the Corporations more than they had calculated they were entitled to; and, further, they had not received more than it had been computed by distinguished accountants and actuaries ought to be paid to them for the kind of property they had held. He also wished to say that the Corporations had a very good bargain, as would be proved on the revival of trade, when they would have a margin of profit after paying all the interest they were liable to, provided they would do what corporations hardly ever did—manage their works well.

After a vote of thanks to the Chairman, the meeting separated.

SOUTH STAFFORDSHIRE WATER-WORKS COMPANY.

The Half-Yearly Meeting of this Company was held last Thursday, at the Queen's Hotel, Birmingham—Mr. FRANK JAMES in the chair—when the following report of the Directors was presented:—

For the half year just ended the gross revenue from water-rates was £21,126 8s. 1d., as against £20,938 13s. 10d. in the corresponding period of last year. The number of houses laid on was 1653, making a total of £30,963 houses supplied on June 30, 1878. After providing for interest on loans, debenture stock, and preference shares, the amount of undivided profit is £9618 2s. 8d.; and your Directors recommend the declaration of a dividend for the half year on the ordinary shares at the rate of 4 per cent. per annum, less income-tax. The amount of this, the thirty-fourth dividend, will be £5987 14s. 6d., and there will remain £3630 8s. 2d. to the credit of next half year.

The Company's new Act of Parliament received the Royal Assent on July 22, 1878. The powers contained in this Act will enable the Company to make certain new works necessary for carrying out the entire system of distribution, and for using with the fullest advantage the works already constructed.

To provide for such new works, and for the completion of the works in progress, your Directors now recommend the Shareholders to make use of the powers of the South Staffordshire Water-Works Act (1875) by creating £87,500 of new capital (that being the balance of the amount authorized by that Act); and your Directors propose that this be issued in the form of ordinary stock, as distinguished from shares, and that this stock form part of the general capital of the Company, and entitle the holders to ordinary dividends rateably with the existing ordinary or original shares to the extent of, but not exceeding, £7 per cent. per annum; that it be offered at par and *pro rata* to

the holders of existing ordinary shares, but that no allotment be made of any fraction of a pound sterling; that, in case any portion of the stock should remain unappropriated on the first distribution, the balance be dealt with by the Directors as they may think fit; that the stock be issued at such date, and the calls on it be made from time to time at such dates and of such amounts as the Directors may determine.

Your Directors propose also that the Shareholders authorize the issue of additional debenture stock (to bear interest at the rate of £4 per cent. per annum) to the extent of one-fourth of the amount paid up from time to time of the £87,500 ordinary stock, in accordance with the provisions of the South Staffordshire Water-Works Act, 1875.

Your Directors further propose now to carry out a long contemplated change in the denomination of the capital of the Company, which change, they are convinced, will tend much to the convenience of the Proprietors. Your Directors propose to convert the shares into stock, and resolutions will be submitted to the Shareholders for carrying out this change. The ordinary or original shares, which are entitled to take 10 per cent. dividends, when earned, to be converted into a corresponding ordinary stock; and the ordinary shares, which are limited to 7 per cent. dividends, to be converted into corresponding ordinary stock. The several classes of preference shares to be converted into corresponding classes of preference stock, ranking in the order of the dates at which they were created, and remaining entitled to the same rates of preferential dividend as now. No change will take place in the rights and privileges of the Shareholders, whether ordinary or preference. The change will consist in the issue of a single stock certificate for each holding, in lieu of the existing cumbrous separate share certificates; in the doing away with the distinctive numbers of the shares; and in creating the power to sell and transfer any number of pounds without the existing restriction to tens.

Dr. *Profit and Loss Account, for the Half Year ending June* 30, 1878. Cr.

Engine charges	£2,703	9	7	Balance brought forward, Dec. 31, 1877	£11,635	17	7
Maintenance of works	1,030	13	3	Deduct amount of 33rd dividend, declared Feb. 21, 1878	6,875	18	0
Wages, turncocks, &c.	637	15	2		£1,759	19	7
Directors attendance fees	375	0	0	Half year's water-rates	21,126	8	1
Salaries—secretary, engineer, and clerks	938	0	0	Service laying	388	5	7
Collectors commission	636	10	10				
Rents	500	3	10				
Rates	1,117	5	9				
Income-tax	173	18	4				
Incidental expenses	183	13	8				
Current law charges	103	2	8				
Discount to landlords	370	16	4				
Allowances	555	1	0				
Bad debts	44	11	6				
Interest on loans	1,905	11	11				
Interest on permanent debenture stock	1,109	9	8				
Interest on preference shares	4,271	7	1				
Balance	9,618	2	8				
	£26,274	13	3		£26,274	13	3

The CHAIRMAN, in moving the adoption of the report, said the Directors considered it wise to declare a dividend for the half year on the ordinary shares of 4 per cent., though it would have been possible, by drawing more largely on the balance in hand, to pay 5 per cent., which was the dividend paid the previous half year. Although the water-rates for the past half year had exceeded to some extent those for the corresponding half year, they were not so large as the water-rates of the preceding six months. He called attention to the question of water-rates, because the diminution arose entirely from depression in trade. The Company had added, and continued to add, a gradual but ever-increasing amount of money to the revenue from the domestic supply. The number of houses to which water had been laid on during the past half year was something considerable, being more than 1600, and the water-rates from domestic supply had increased something like £1000 since the previous half year. But the trade supply, and that in the great centres of industry, had greatly diminished; in fact, they could point to some ten or a dozen of their largest consumers whose accounts diminished to the extent of £750 last half year. Of course, they could only look to an increase in the ordinary supply for trade purposes to keep up the payment of a good dividend, beyond the fact that the domestic supply was ever increasing. Taking a period of seven years, the domestic supply had increased at the rate of something like £800 a year. The Directors hoped, however, that what they had lost of trade supplies during the last year or half year they might recoup again as trade revived. The Shareholders must bear in mind, also, that, with regard to the domestic supply, the Company had certain obligations imposed upon them by their Act of Parliament—given to them, he granted, upon their own application—to provide, under heavy penalties, a supply of water for every one in the district who required it. Therefore it was necessary that the Company should be prepared to fulfil their obligations, and by the expenditure of money they had put themselves in a position to do so. It was quite true that in the formation of a water-works company, as they all had reason to know, for many years the Shareholders would have to go without any dividend at all. The history of this Company was not singular in that respect. For many years, from the commencement of the laying out of their capital for the distribution of water, no dividend at all was paid. Since 1875 they might, to some extent, be said to have established almost new water-works; they had increased their capital so fast, so as to enable them to comply with these obligations. But instead of waiting for interest upon that new capital until they could get a demand for all the water they were raising, they had been paying the Shareholders interest during the whole time. With regard to the domestic supply, he was glad to find that the Local Boards of the district were evincing a greater amount of concern, and were actually taking steps to compel owners of property to lay on water. The Company expected a great deal from the Local Boards, and he did not think there ought to be the slightest antagonism between them. The Company always did their best to consult their interests, and frequently laid down mains without asking the 10 per cent. guarantee for three years, which their Act of Parliament gave them power to do, trusting that the Boards would take advantage of them when so laid down. The statement of accounts showed that the maintenance of works—£1030 13s. 3d.—was less by £300 than that item in the corresponding period of last year, and this reduction had not, he could assure the meeting, been effected at the expense of efficiency. With regard to the condition of the works, nothing could be more creditable to the Engineers. The question of rates was a very serious one. The Company's rates, which were £800 last half year, were now £1117, and this ought to have its effect upon the Local Authorities. The Local Boards should recognize that the Company were contributors to the rates, both directly and indirectly—directly, by paying £2000 a year, and indirectly, by supplying water to the districts, and thus preventing disease, which would necessarily increase the rates. The Company had entire power over whole districts, and he believed their works were so constructed and so placed that they were equal to meeting the demand of every inhabitant.

Mr. J. N. BROWN seconded the motion, which was carried.

A SHAREHOLDER inquired how much of the new capital was productive, and if the £87,000 which was proposed to be raised, and the £20,000 debenture stock, were required to complete the work in hand.

The CHAIRMAN replied that since 1875, which was the date of the Act, up to June, 1878, £220,918 was actually expended. Of that sum, perhaps £80,000 had been expended on ordinary extensions, while £150,000, in round numbers, or perhaps more than that, had been capital from which the Company at the present moment had not derived one farthing of benefit. They paid interest upon the whole of it, but were not receiving any benefit from the outlay. They were bound to expend the money, and it was from the increased quantity of water taken within their own district that they were to look for a return on the capital employed.

The report was adopted, and, on the motion of the CHAIRMAN, a dividend of 4 per cent., in accordance with the report, was declared.

An extraordinary meeting was then held, at which it was resolved to create £87,500 of new capital, to provide for new works; to raise additional debenture stock to the amount of £21,875; and to convert the shares into stock.

A vote of thanks to the Chairman and Directors brought the meetings to a close.

BOROUGH OF PORTSMOUTH WATER-WORKS COMPANY.

The Half-Yearly Meeting of this Company was held on Thursday, the 29th ult.—Lieut.-Col. EDWIN GALT, J.P., in the chair.

The SECRETARY (Mr. R. W. Ford) read the notice of meeting. The report, which was as follows, and the accounts were taken as read:—

The Directors herewith beg to submit the usual half-yearly statement of accounts up to the 30th of June last.

The entire share capital of the Company—£180,000—has been now called up, and all paid, with the exception of a small sum of £656 15s., a portion of which, however, has been paid since the closing of the half year's accounts.

The loan capital amounts to £43,900, being within £100 of the Company's entire borrowing powers.

On the revenue account it will be seen that the total revenue under all heads has been £14,919 11s. 4d., of which £14,533 7s. 3d. has been for water services. The expenditure on the same account has been £4824 18s. 9d. The balance (less irrecoverables)—£9906 7s. 9d.—has been carried to profit and loss, on which account there is a balance of £10,553 14s.

Estimating a sufficient allowance for void houses, irrecoverable arrears, and collector's commission in respect of the June quarter's water-rents in course of collection, and for proportion of income-tax, your Directors beg to recommend that a dividend be declared on the share capital at the rate of 9 per cent. per annum (free of income-tax), which will consume about £7815; that £600 be voted to rest or reserve, and that the balance be carried on to the credit of the current account, as it must be borne in mind that to pay a dividend at the same rate will require a larger sum next half year than this, as a considerable portion of capital has been called and paid up during the past half year.

The rest or reserve-fund is, at the present time, £3293 9s. 9d., of which £3085 12s. 7d. is invested in Government securities.

The Company's revenue for water services during the past half year (subject to deductions for voids and irrecoverables) has been £14,533 7s. 3d.

This substantial increase arises principally from the meter supplies, and amongst them chiefly from the Government services. The result has amply justified the large expenditure incurred in giving the Dockyard and Admiralty departments an independent supply by a separate main, under the agreement referred to in your Directors previous reports.

During the half year 237 additional house services have been laid on.

The quantity of water pumped into the service reservoirs on Portsdown Hill (Farlington) during the half year has been 823,851,000 gallons, giving a daily average of 4,526,000 gallons, as against the average of 3,566,000 gallons for the corresponding time last year.

This is a large increase of consumption, and, although partly owing to the increased meter supplies and increased pressure, shows the care which is required in introducing the constant service system of supply, the necessity for an efficient system of inspection, and for requiring full compliance with the constant service regulations as to the house fittings. Your Directors regret that the requisite alterations and fittings are not proceeded with by the consumers so fast as they could wish, which prevents a more rapid application of the system.

There are upwards of 30 miles of mains now under constant pressure night and day, and the other districts will be put in the same position as fast as the houses are put into proper condition in accordance with the published regulations.

The large increase of consumption above mentioned, and the growing requirements of the neighbourhood, and particularly of the Government establishments, necessitate a new rising main from the Havant works to the reservoirs, and some increased pumping power. The present 20-inch rising main is not sufficient, in view of the increasing demands, and in order to make more safe and efficient provision for next year, your Directors have ordered an additional 24-inch rising main at once, which is to be laid complete before the commencement of next summer.

In order to meet this expenditure, and to have the necessary command of funds for the Company's purposes as and when they arise, it will be necessary to obtain parliamentary powers for raising additional capital. Your Directors have not yet determined on the sum to be so raised, but they will take care to keep the amount within as moderate limits as possible, consistently with the interests of the Company and the probable requirements of so large and important an undertaking.

The Consulting Engineer reports that the engines, reservoirs, and works generally are in good and efficient order; but that the additional rising main above referred to is indispensable.

The Directors retiring by rotation are Mr. Joseph James Galt and Mr. Edward Kent Parson, both of whom are eligible, and offer themselves for re-election.

Dr. *Revenue Account, for the Half Year ending June* 30, 1878. Cr.

Wages	£1,059	15	3	Water and meter rentals	£14,533	7	3
Repairs	425	15	2	Rents of properties	361	15	0
Coals	977	1	11	Sundries	20	2	0
Gas and oil	46	8	4	Interest on calls	4	7	1
Rates and taxes	813	0	0				
Collectors commission	335	6	7				
Printing and stationery	170	8	11				
Salaries	441	5	0				
Directors	250	0	0				
Auditors	21	0	0				
Insurance	2	0	0				
Miscellaneous	100	12	10				
Rents	7	11	0				
Irrecoverable debts	188	4	10				
Income-tax	172	13	9				
Balance carried to profit and loss account	9,906	7	9				
	£14,919	11	4		£14,919	11	4

The CHAIRMAN moved the adoption of the report and approval of the accounts, and explained that it would be necessary to obtain powers to raise additional capital in order to carry out the further works which were necessary, so as to anticipate the requirements of the Portsmouth and other districts the Company supply, amongst which he referred to the necessity for a new rising main to the upper reservoirs on Portsdown Hill, which had been ordered, as it was essential that the Company should be thoroughly prepared for the demands which were being made upon their resources, both by the large Government establishments and the consumers generally, especially Southsea, which was so fast increasing in population and importance.

The SECRETARY gave various explanations as to the provisions of the Company's Acts of Parliament as to the reserve-fund, and other points, which were referred to by some of the Shareholders as perfectly satisfactory.

Several of the Shareholders took part in the discussion which followed, unanimously approving of the proceedings and policy of the Directors, and congratulating them upon their successful management.

The CHAIRMAN stated that between 9000 and 10,000 houses had already been placed on a constant supply, and the other parts of the district were being proceeded with as quickly as possible, the only delay being on the part of the consumers, many of whom were very slow in complying with the regulations and conditions which were necessary for the constant service system.

The report and accounts were unanimously adopted, a dividend of 9 per cent. declared, free of income-tax, with a substantial balance brought on to current account, and £600 carried to the reserve-fund.

The retiring Directors were unanimously re-elected, and a cordial vote

of thanks was passed to the Chairman and the Directors for their valuable services.

The CHAIRMAN duly acknowledged the vote, and said that the Directors did not forget that they had important duties with regard to the public interests, as well as to the financial interests of the Shareholders. To these they would give constant attention, and they hoped ultimately to reach maximum dividends, and keep up the prosperity of the Company, while giving satisfaction to the inhabitants of the neighbourhood.

LEICESTER CORPORATION GAS SUPPLY.

A Special Meeting of the Leicester Town Council was held last Tuesday —the MAYOR (Mr. C. Stretton) in the chair—when the following report of the Gas Committee was presented:—

The Gas Committee have to report that the accounts of this undertaking for the last half year, ending June 30, have been submitted to them, from which it appears that the net profit, after paying all working expenses, is £17,284 4s. 11d. From this amount the Shareholders in the late Company have received £9991 13s. 11d. as dividend upon their shares, and the balance of £7292 11s. has been carried to the reserve-fund, making it £42,311 3s. 1d.

By the Act of Parliament under which these works have been acquired, a reserve-fund of £5000 is authorized to be established out of the revenue—*i.e.*, future revenue, of the undertaking; but your Committee feel that they would not be justified in appropriating any portion of the balance handed over to them by the Directors for that purpose, and, therefore, they recommend that the whole amount of £42,311 3s. 1d. be transferred to the new capital account.

Your Committee have further to report that contracts to the extent of over £90,000 have been let in connection with the new works, and which are within the original estimates. The work is progressing satisfactorily under the superintendence of Messrs. Shenton and Baker, the Architects, and Messrs. Robinson, the Managers.

Alderman GRIMSLEY, in proposing the adoption of the report, said he thought that he might congratulate the Council upon the valuable undertaking they had recently acquired. The accounts for the past half year showed a net profit of £17,284, against a profit of £14,552 in the corresponding half year of 1877. The profits for the half year ending December, 1877, were £12,140, compared with £9984 in the corresponding period of the preceding year. The accounts, therefore, showed that during the past year the Company had made additional profits, over and above the amount realized in the preceding year, of £4988. The Shareholders, under their arrangement with the Corporation, had an annual income of £19,066. The net profits during the past year had been £29,424; and thus the balance of profit, after all the Shareholders had received their dividends, was last year no less than £10,358. When he submitted the proposition for the acquisition of the gas-works, he ventured to hope that, upon the Corporation first entering upon the works, the accounts might show a profit of £8000 or £10,000. He was happy to say that the results were as satisfactory as he had predicted; in fact, more so. There was one feature in connection with the undertaking to which he wished to call attention. The Shareholders, under the old arrangement, before Mr. Raikes's Standing Order in reference to the sliding scale of price and dividend was adopted by Parliament, could this year only have divided £16,683; but this year, or since its adoption, they could actually have divided £19,707, and that was only upon the receipts for eleven months. If the Standing Order had been adopted before, the Shareholders could this year, out of the receipts for the twelve months, have received £19,983 7s. 10d., or £3300 17s. 10d. more than they could have divided before its adoption. He mentioned this to show that the present position of the Shareholders, under their arrangement with the Council, was not so good as it would have been to the extent of £800 or £900, and he thought that this must be a very gratifying feature to the Town Council. At all events, he might congratulate them that they had made their arrangement for the purchase of the gas-works before the proposition of Mr. Raikes had been adopted. If they had not done so, the Corporation would, of course, have had to pay a higher price for the works. But the Shareholders at the date of the purchase had merely been receiving fixed dividends, and the Council had decided to pay them ½ per cent. in addition. Had the purchase not been completed at that date, the Shareholders would now have been actually receiving more than they were being paid by the Corporation. There was another feature that must be exceedingly gratifying to the Council. They were not only about to enter into the possession of works about as perfect as any works in the kingdom, but to acquire a reserve-fund of no less than £42,311. That amount would, of course, be appropriated to the ordinary purposes of the undertaking, or to promote the progress of the extension now being carried out on the Aylestone Road, or to whatever object the Gas Committee might decide to apply it. He thought that this surplus, therefore, was a very important matter. With reference to the question of a reserve-fund, under the Act, they could establish a fund to the extent of £5000. In the meantime, they did not consider that they would be justified in appropriating any of the money which had been handed over to them by the Directors to that purpose, as the Act stated that "it shall be formed out of the future revenue of the works." Of course, they would take care that a reserve-fund should be established sufficient to meet any ordinary exigencies that might arise in the conduct of the business. He wished, however, to throw out a word of caution. During the present year there would be considerable outlays in connection with the new works, and the capital expended would be unproductive. Under these circumstances, it would not do to estimate that because the Company had made a net profit of £10,000 last year there must of necessity be a net profit of £10,000 in the next, under the management of the Corporation. His own conviction was that, notwithstanding the amount of unproductive capital being expended on the works on the Aylestone Road, they might expect a clear profit of £10,000. If his expectations were once more fulfilled, sanguine as some people might suppose him to be, he was sure that the result could not fail to be most gratifying to the whole community.

The report was then adopted.

MAIDSTONE GAS COMPANY.—The annual meeting of this Company was held on Tuesday, the 20th ult.—Mr. Ambrose Warde in the chair. The accounts presented were most satisfactory, and the usual dividends were declared. The report of the Directors showed that the year had been a very prosperous one, and that the continued use of West's patent apparatus and system for drawing and charging the retorts afforded additional evidence of the great value of the invention; the yield of gas per ton of coal being 10,600 feet, and the illuminating power fully 15½ candles, although only one-half per cent. of cannel was used during the winter months, when half the gas required was made upon the new system. This good working enabled the Directors to reduce the price of gas to 3s. 3d. per 1000 feet. The Directors anticipated still further improvements when the new retort-house, which has been built and fitted up with West's patent apparatus, was put into operation, and all the gas made by mechanical means. The new exhausters, boilers, steam hoists, washers and condensers, and the new purifiers that have been especially designed by Mr. West for the removal of the sulphur compounds, and received the approval of Dr. Odling and Mr. Keates, and are now being erected by Messrs. Cutler and Son, will be in operation before the winter season. The report and balance-sheet were adopted, and Messrs. Edmett, Lendon, and Haynes, the retiring Directors, were re-elected. The meeting closed with a vote of thanks to the Chairman.

LIVERPOOL WATER SUPPLY.

THE WORCESTER TOWN COUNCIL AND THE PROPOSED ABSTRACTION OF WATER FROM THE SEVERN.

A Special Meeting of the Worcester Town Council was held on Monday, the 26th ult.—the MAYOR (Mr. F. Dingle) in the chair.

Mr. BOZWARD moved—"That this Council views with sentiments of alarm the project of the Corporation of Liverpool for the diversion of the waters of the Vyrnwy, one of the chief affluents of the Severn, for the water supply of that town; and believing that the threatened diversion, while jeopardizing the navigation of the river, is fraught with peril to public interests, declares it to be obligatory to offer at once an uncompromising opposition to the promotion of the project, and proceeds forthwith to instruct the Town Clerk accordingly." He said that if the scheme was proceeded with it would be disastrous to the water supply of Worcester, in consequence of the large abstraction of water from the river, and that they would have to erect other water-works. The Liverpool people offered a compensation which he did not see how they could give. He urged upon the Council not to temporize with Liverpool, but at once boldly oppose the scheme, and the Town Council of Liverpool would drop it; and if the Worcester Town Council did what he proposed, it would have the effect of stirring up the other towns on the river.

Alderman JONES seconded the motion.

Alderman STALLARD spoke against it, and said he was not prepared at the present time to have a parliamentary fight with the Liverpool Corporation. He had visited the spot, had heard what the Liverpool people had to say on the matter, and now preferred waiting until they saw the report of the engineers who had been appointed by the Severn Navigation Commissioners and the Severn Board of Conservators.

Alderman LONGMORE agreed with Alderman Stallard, and moved—"That the consideration of the question be adjourned until the Council see the reports of the engineers appointed as to the effect the Liverpool proposal would have on the navigation of the Severn and its fisheries."

Mr. NOAKE seconded the amendment.

Mr. AIREY opposed Mr. Bozward's motion, and quoted from the speech of Mr. Leader Williams at the meeting of the Severn Navigation Commissioners, to show that even if the scheme were carried out it would not have the disastrous effect Mr. Bozward predicted.

Mr. SCOTT was in favour of an opposition to the scheme, but could not vote for the motion as it at present stood.

Mr. LECHMERE-PUGH advised Mr. Bozward to refer the question to the General Purposes Committee.

Mr. BOZWARD declined to do this; but agreed to exchange the words of the last sentence and substitute the following:—"That the Town Clerk be directed to forward copies of the resolution to the Corporation of Liverpool, and to Mr. Henry George, Clerk to the Severn Board of Conservators."

A division took place, when Mr. Bozward's motion was rejected by 8 to 7.

Mr. AIREY moved that the matter be referred to the General Purposes Committee, which was seconded by Mr. FISHER, but the Council broke up without any decision being come to.

BIRMINGHAM WIRE GAUGE.

The Twelfth Annual Report of the Warden of the Standards (Mr. T. H. Farrar), which has just been issued, contains the following remarks on the above question:—

In the last report reference was made to the Birmingham wire gauge used by engineers and those engaged in the metal trades in measuring wires and metal plates.

This gauge (hereafter referred to as B.W.G.) is represented by a series of numbered slots or cuts on the edges of a small rectangular steel plate. It is the practice to distinguish the diameters of wires and the thickness of plates of metal by the number of the slot or cut which the wire or plate may fit.

There is no standard of such gauge, or common agreement amongst those interested as to what are the dimensions, in parts of an inch, of the several slots or sizes of the true B.W.G. Its sizes are not geometrically or arithmetically progressive, and consequently bear no definite relation to each other. Its origin is obscure, and it would appear that the several slots or sizes arose from time to time as a new wire or a new plate was introduced, and as the exigencies of a particular trade demanded. Considerable annoyance to engineers, and pecuniary loss to contractors, is stated to occur from a want of accuracy in the copies of this gauge, and the necessity of establishing a standard has lately been discussed both in this country and in the United States.

In Germany, gauges for wire or sheet iron have not yet been officially controlled. Independently of a number of gauges, differing from each other, in use in the various manufacturing districts, the Birmingham wire gauge, commonly called the "English gauge," is mostly in use in Northern Germany for measuring sheet iron, wire, and hoop iron. In Southern Germany the B.W.G. is also used, and for the measurement of wires the French gauge, which is a progressive scale of tenths of a millimètre (1 millimètre = 0·0393709 inch) is also used. For sheet iron the "Dillingen gauge," which is a scale of Paris lines (1 line = 0·08881377 inch), is also used in Southern Germany. The wire factories in Westphalia use a particular gauge, called the "Bergish or Westphalian," the sizes of which, like the B.W.G., are established by arbitrary progression. For some time past the question of establishing a uniform wire gauge and a uniform numbering of wires has been energetically agitated in Germany.

General Gloukhoff states that in Russia there is no standard gauge for wire and sheet metal. The manufacturers in Russia use different gauges of English, German, and French patterns.

In Canada, only one gauge is known to mechanics—the Birmingham wire gauge, made by Stubs, of Warrington.

In France, measurements are made by the scale of one-tenth of a millimètre, as well as by the Birmingham and Dillingen arbitrary gauges.

In America, the B.W.G. is extensively used. From the information kindly forwarded to this department by Professor Hilgard, it would appear also that the wire gauge made by Messrs. Browne and Sharpe, of Rhode Island, and adopted by the brass manufacturers in 1858, is also used in the United States. This gauge has, however, no official sanction. A committee of the American Institute of Mining Engineers recently reported on this subject (Dec. 22, 1877), and they recommended the adoption of the system of expressing sizes in thousandths of an inch, as in the Whitworth gauge, or in fractions of a millimètre.

It appears from this information that the B.W.G. is extensively used abroad as well as in this country, and that efforts are being made to secure more uniformity in the measurements of wires and sheet metal.

Although the present B.W.G. appears to be sufficiently accurate for the workman's purpose, it is stated to be ill adapted for the use of engineers and others demanding accurate measurements. The efforts which have been made by Sir Joseph Whitworth, and recently by Mr. Latimer Clark, Mr. C. V. Walker, and other authorities, to introduce a better system of measurement, indicate the necessity of some regulation of these trade measures. Proposals have been made from time to time to introduce a new and corrective gauge, calculated on such a scale as would correct the irregularities of the present B.W.G., by introducing a series of sizes progressing arithmetically or in aliquot parts of an inch.

No corrective scale of numbers and sizes has, however, been yet made known, which does not differ so appreciably from the present B.W.G. as to render its acceptance very doubtful by those who have to handle such instruments. To set up a new gauge would only be to add to the confusion already existing.

In 1846, Mr. Holtzapffel ascertained the dimensions, in parts of an inch, of good specimens of the B.W.G. of that time. The general acceptance of his measurements, and their practical agreement with the experience of this department, indicates a basis upon which it would be possible to construct a standard of this gauge.

This department, however, could not recommend that an arbitrary measure like the B.W.G., notwithstanding its present extensive use, should be legalized as an imperial secondary standard measure. In any contract, bargain, sale, or dealing, the sizes of wires and metal plates are legally expressed only in imperial measure or in parts of an inch.

So long as manufacturers continue to use an arbitrary measure like the B.W.G., whose accuracy cannot admit of verification, so long will differences exist in the relative sizes of their productions.

ON THE DISCHARGE OF SEWAGE INTO TIDAL RIVERS.

By Mr. Henry Law.

[A Paper read before the Mechanical Science Section of the British Association, Friday, August 16, 1878.]

The present paper "On the Discharge of Sewage into Tidal Rivers" is intended as a contribution towards the important subject referred to by the President in his opening address—namely, the treatment and conservation of rivers.

This subject is not only one of great general importance, but is of peculiar interest in Dublin, where the question of the disposal of the sewage in such a manner as to avoid the pollution of the River Liffey has long received the most anxious attention and consideration.

And it is the more desirable that this question should be brought forward for discussion, because it is one upon which, even in the minds of those who might be regarded as authorities upon the subject, great confusion and misapprehension appear to exist. For example, in a recent article in the *Builder* it is gravely asserted (and certain figures are given in support of the assertion) that the actual effect of the discharge of the effluent matter from the London sewers into the River Thames at the two points of discharge—namely, Barking and Crossness—is to produce "a mixture of less than two parts of water to one of sewage."

And Mr. William Hope, whose name has long been before the public in connection with this subject, in a recent letter addressed to *Engineering*, makes the startling assertion that the pollution of the river by the sewage is cumulative—that is to say, in other words, that there is no fixed limit to the per centage of sewage pollution, which must go on in an ever-increasing ratio.

It is, therefore, of great importance to examine this matter with some care, in order to determine with exactness what are the actual conditions of tidal rivers into which certain quantities of polluting matter are discharged.

Now, a tidal river may be looked upon as a reservoir of a very elongated form, subject to the following conditions, namely:—

1. That it is supplied with water of three different qualities from three different sources, that is to say:

The water constantly draining off of the surface of the basin forming the watershed of the river, and that derived from the land springs which find vent in its bed; this we will designate river water.

The water entering the mouth of the river from the sea under tidal influence, which we will distinguish as sea water.

The polluted water discharged from the sewers, which we will term sewage.

2. That the actual and relative quantities of these are not constant, but vary within certain limits.

3. That the supply of sea water is not constant, but intermittent—being poured into the reservoir for a certain number of hours, and then, for a certain period, the reservoir being allowed to discharge a proportion of its contents.

Now, in the actual state of things, the river water may, and usually does, enter the channel of the river by tributary streams at various points, and the sewage may be discharged at many different places, while the quantity of both the river water and the sewage will vary, according to the amount of the rainfall and other circumstances; but, in inquiring as to the ultimate degree of pollution of the river, we may simplify the question under consideration, without in any way invalidating the result, by assuming that the whole of the river water enters by the upper extremity of the channel, or elongated reservoir, and that its flow is uniform, and equal to the mean quantity taken over a lengthened period; further, that the sewage is all collected and discharged into the channel or reservoir at some intermediate point, and that its flow is also uniform, and equal to the mean quantity; furthermore, that the sea water is poured in at the lower extremity of the channel at regular intervals for a certain period, and that the only discharge of the contents of the channel or reservoir is at its lower extremity, also for a definite time, and in such a manner that, for a certain period in every twelve hours, the contents of the reservoir would be accumulating, and, as a consequence, the level of its surface rising, and that then, for a certain time, the contents would be diminishing, and the level of its surface falling.

Now, the subject of our inquiry is, what, under the conditions assumed above, will be the mean or average composition of the water contained in the reservoir or river?

In order to obtain a practical result, let us investigate this question, adopting the mean values for the several quantities which apply in the case of the River Thames.

First, then, as to the extent and capacity of the reservoir. The tidal portion of the River Thames extends from Yantlet Creek, where the jurisdiction of the Conservators commences, to Teddington Lock, a total distance of 318,160 feet, or about 60¼ miles; its breadth varies from about 200 feet to 22,800 feet, or about 4½ miles at its mouth. Its superficial area at high water is 58,182,380 square feet above London Bridge, and 1,054,362,660 square feet below the same, making a total of 1,112,545,040 square feet, or about 40 square miles. At low water the superficial area above London Bridge is 38,807,800 square feet, and that below the same 681,786,610 square feet, making a total of 720,594,410 square feet, or nearly 26 square miles.

The mean range of the tide at the mouth, that is, at Yantlet Creek, is 14 feet; at London Bridge, 17 feet 4 inches; and at Teddington Lock, 3 feet.

The mean tidal capacity of the river—that is to say, the difference in the quantity of the water which is contained by the river at high water and at low water, with the above stated mean range of tide, is 616,634,400 cubic feet above London Bridge, and 13,562,903,900 cubic feet below the same, making a total of 14,179,538,300 cubic feet.

Now, as has been already stated, this body of water is derived from three sources—viz., the sea, the land drainage, and the sewage; and it is necessary in the next place to ascertain the relative quantities furnished from each of these sources.

The downward flow of the Thames at Seething Wells, near Kingston, a short distance above Teddington Weir, and beyond the influence of the tides, was gauged daily for eleven years by Mr. Taylor, and the result obtained was an average annual discharge of 500,000,000,000 gallons, which, reduced to a mean daily flow, would equal 1,369,800,000 gallons. This is, however, the drainage of only 3676 square miles, whereas the whole area of the Thames Valley is 5162 square miles; and if we assume, as may very fairly be done, that the quantity discharged from the lower portion is in the same proportion, we shall have for the total mean daily discharge from the drainage of the Thames Valley 1,923,626,000 gallons—a quantity which, we may incidentally remark, is about one-third of the rainfall.

From the above, however, must be deducted 100,000,000 gallons, which are daily abstracted from the river above Teddington Weir for the supply of water to the Metropolis, leaving a total quantity of 1,823,626,000 gallons, or 291,780,160 cubic feet for the mean daily discharge, being 145,890,080 cubic feet as the mean quantity of river water contributed each tide.

The mean quantity of the sewage discharged into the Thames from the two outfalls at Barking and Crossness may be taken at 120,000,000 gallons daily, equivalent to 9,600,000 cubic feet every tide, making with the river water a total of 155,490,080 cubic feet, which being deducted from the mean quantity already stated as that which enters the river every tide, we have 14,024,048,220 cubic feet as the mean quantity of sea water which enters the Thames every tide.

It is difficult to form a true idea of the relative values of such large numbers, and, therefore, it is better to reduce them to a per centage, when we obtain the following result—namely, that the mean composition of the Thames water is as follows, namely:—

Sea water	98·91
River water	1·02
Sewage water	·07
	100·00

That is to say, the actual mean quantity of sewage in the tidal portion of the River Thames extending from Teddington to Yantlet Creek is only 0·07 per cent., or, otherwise expressed, only 1-1477th part of its whole bulk.

Furthermore, it must be borne in mind that owing to the circumstance of the river water always being delivered at the upper end of the elongated reservoir, no less than 60 miles in length, while the ultimate discharge is wholly from the lower extremity, the composition of the water varies greatly, being always much freer from sea water and sewage in the upper portion than the lower. In point of fact, it must be evident that in the case of a stream which has a certain quantity of river water—that is, as we have already defined it, water derived from the rainfall and discharged into the river by surface drainage and land springs—there must always be a point, even in the tidal portion, above which no contamination can exist from sea water or other matters which enter the river near the lower portion of its course.

The foregoing is a statement of the average result, the actual amount of contamination by sewage at any given time and place must depend upon the recent past rainfall, and upon the state and condition of the tides, but at no time and under no circumstances can the amount of the sewage contained in the Thames water be raised sufficiently above its average value of 1-1477th part to produce any appreciable pollution, far less to afford any ground for the statements to which previous allusion has been made.

Generally, it is obvious that considerable care should be taken in the selection of the points of discharge of sewage matter into tidal rivers, and of the times and conditions of such discharge.

One of the most essential of these conditions being that the sewage shall be so discharged as to be carried into the main steam in such a manner that it may be commingled with a sufficient bulk of water, and that water travels with a sufficient velocity to ensure no deposition by precipitation of any of the contained matter being possible.

Again, the point selected should be one where the course of the stream is direct, and not subject to eddies or sets upon either of the shores, so as to ensure the thorough absorption and mixture of the sewage with the main bulk of the river, and to prevent any deposit taking place upon the foreshores.

Where populous places exist upon the banks of a river, it is, of course, necessary that no sensible pollution of the stream from sewage matter should be suffered in the neighbourhood of such place, and, in most cases, there are two modes of obtaining this result—namely, by the removal of the point of discharge to a sufficient distance below the town; and by the discharge of the sewage during only a limited portion of the ebb tide. To effect the first object, it will be necessary to construct sewers probably of a considerable length; and to effect the second, to form tanks of sufficient capacity to permit the sewage to accumulate during the intervals between the times of discharge.

It is obvious, therefore, that there is an ample field for the skill of the engineer to be exercised in so designing works for the discharge of sewage into tidal rivers as to fulfil, in a perfect manner, the foregoing essential conditions, and that it is under such conditions only that such discharge should be permitted.

THE COAL AND GENERAL TRADE OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

There is absolutely no autumn business. The only branch of the coal trade that is doing anything is gas, and that was a little weaker last week. There is a miserable coasting inquiry, and until the harvest is through, not much business will be done to the bye-ports, as the carts needed to carry coals inland from the vessels are busy with the harvesting. A good few of the smaller gas companies are also pretty well stocked, having picked up bargains during the summer. The steam and house coal trades are rather worse off for orders. The markets have a slightly downward tendency, and it is feared, if business does not improve, some more of the smaller second-class collieries will have to close. They cannot possibly pay at present.

The coasting freight market continues to be excessively dull, though, at the same time, a trifle more money has had to be given to a ready steamer or two. The rate to London is 4s. 1½d. steamers, and about 5s. sailing vessels; Dublin (gas), 5s. 9d. per ton; Hamburg, £5 to £5 10s. per keel; Havre, 5s.; Rouen, 6s. 3d. per ton; Bordeaux, for six months (gas), £7 per keel. Rates to the Baltic and Mediterranean have been a trifle better—about 5s. per keel. Homeward business, too, is also stronger from those seas, and from the United States.

The chemical market is very flat. There is an entire absence of the usual autumnal shipping orders. Prices are lower, with a still further tendency downwards. The iron market is, off and on, about the same as it has been for a month. There are no indications of any great improvements likely to occur in the manufacturing trade of the North this side of Christmas. A few fire-clay goods are being despatched to London by small sailing vessels at a very moderate figure for freight. The manufacturing trade of the Continent gives no indication of improvement, and the shipments thence continue to be made up in small parcels, and the business is

of the same hand-to-mouth character as has characterized the whole of the year. Pig lead is selling in the local markets here at £16 10s. per ton.; dry white lead, £23; red lead, £18; flake litharge, £19; copper, flat cake and ingot, £66 to £68; best selected, £72 per ton.

THE LANCASHIRE COAL AND IRON TRADES.

(FROM OUR OWN CORRESPONDENT.)

The coal trade of this district is still without any appreciable improvement, and although there are a few more inquiries in the market, these do not yet lead to much new business. A few of the contracts for gas coal which have been held over are, I understand, now being settled; but colliery proprietors complain that it is still as difficult as ever to obtain remunerative prices, and some of the coalowners are declining to contract at all at the rates which are now ruling in the market; but there are at some of the pits such heavy stocks of all descriptions of round coal, whilst in the majority of cases they are not working more than three to four days a week—some even less—that large consumers have not much difficulty in obtaining supplies pretty much on their own terms. Common coal is still a great drug, and for sales in bulk very low figures are taken. Underselling continues to prevail in the market to a great extent, and fixed list rates are little more than nominal. Best Wigan Arley, suitable for house-fire purposes, is quoted at about 9s. to 9s. 6d. per ton; but the secondary sorts can be bought at from 7s. to 8s.; Pemberton four-feet, at 6s. 6d. to 7s. 6d.; and common coals at from 5s. to 6s. per ton. Good qualities of engine fuel continue in fair demand at about late rates, but the inferior sorts can be bought at very low figures. Good burgy, at the pit mouth, is quoted at from 4s. 6d. to 5s. per ton; and good slack at from 3s. 6d. to 4s. per ton, with the common classes of both descriptions of fuel offering at about 6d. per ton less.

In the iron trade there appears to be less activity. Some makers of pig iron are not securing much new business at present; but as their limited make is pretty well sold for the remainder of the year, they are not pushing for new orders at anything below their full list rates. In outside brands of iron, however, there is a good deal of underselling, and lower prices are being taken than were asked a week or two back. The finished iron trade is without improvement, Lancashire bars delivered into the Manchester district being still quoted at about £6 per ton; and very few of the works are going anything like full time.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

At a Special Meeting of the Dumfries Gas Commissioners, held last Thursday, the question of reducing the leakage of gas was under consideration, an elaborate report upon that subject having been submitted to the Gas Committee by Mr. Malam, the Manager, the adoption of which was unanimously recommended by the Committee. Mr. Malam admitted that the loss of gas in the mains and service-pipes, public lamps, and bad meters equalled 28 per cent. last year, as compared with the station-meter at the works, and he said that, if it could be reduced to, say, 14 per cent., there would be realized an extra sum of £1300 per annum. In his detailed report upon the condition of the street-mains in different parts of the town and in the transpontine burgh of Maxwelltown, he mentioned a number of instances where the pipes were 53 years old. The recommendations embodied in the report were unanimously agreed to by the Commissioners, the estimated cost of alterations in the street-mains being £638 7s. One of the Commissioners said that he found, in going back to Corporations such as Kilmarnock, Perth, Arbroath, or Dundee, that they had been in just the same predicament as Dumfries. In Kilmarnock the leakage was 25 per cent., and it had been brought down to 16 per cent.; Perth was now down to 9 per cent., and Arbroath had come down from 17½ to 12 per cent.

On Thursday last the works of the Falkirk Old Gas Company were exposed for sale by public auction, the upset price being fixed at £7500. The ostensible purchaser was Mr. Andrew Duncan, of Langholm, formerly the lessee of the gas-works in that town; but I understand that Mr. M'Gilchrist, of Dumbarton, and Mr. Young, of Clippens, are associated with him in the purchase. The fact of three "outsiders" coming in and securing the works is a matter of some little interest, when it is considered that overtures had been made for the Town Council to take over the gas supply of the town, under the Burghs (Scotland) Gas Supply Act. However, as there is another Gas Company in the town, whose distributing mains extend several miles outside the burgh, the Municipal Authorities did not feel justified in adopting the Act, as it would have involved the purchase of the property and rights and privileges of two Companies; besides which they had other important work on hand. It was thought that the new Company would have made an offer, and that they were even determined to have bade for the works against all comers; but their advisers seem to have been struck dumb when Mr. Duncan offered the upset price, and neither they nor any one else offered any competitive bid. The annual production of gas by the old Company has latterly been from 8 million to 9 million cubic feet. The selling price to the consumers during the past year being 5s. 10d. per 1000 feet. Considering the proximity of the works to supplies of excellent cannel coal, there seems to be no good reason why the price should not be reduced, and the consumption increased, as soon as the new owners enter upon the possession of their property. The superintending management will, doubtless, fall on Mr. M'Gilchrist, whose reputation as a successful Manager at Dumbarton is well known. He, at present, gives excellent gas (28 candles) at 4s. 7d. per 1000 feet, while the Corporation not only get their supplies at 4s. 2d. per 1000 feet, but are likewise put into possession of a handsome annual profit. When the works at Falkirk are thoroughly overhauled, it is not unlikely that the new Proprietors may arrange to give the Aitken process a thorough trial, and demonstrate the possibility of making it yield gas of high illuminating power at a low price, and with profit to the manufacturers. Looked at in this light, the purchase just referred to may be regarded as one of considerable importance to the gas world.

Having alluded to the Aitken process, I may mention that there is at present under consideration a proposal to "run" the Hamilton Gas-Works for a period of six weeks on the ordinary system, under the present Manager (Mr. Johnston), and then to try that process for a similar period, Mr. Aitken having the privilege of putting the works under the management of any person whom he may select. The results of such a competitive trial, if carried out, will doubtless be looked forward to with interest by gas managers, gas companies, and gas corporations in other parts of the country.

The Wishaw Gas Company have resolved to reduce the price of gas to their consumers to 3s. 9d. per 1000 cubic feet, the reduction being 10d. At present this is only the second example of gas being sold at that price in Scotland, although at one time Coatbridge was on a similar footing, and Paisley also had gas at the same price some time prior to the great rise in the price of coal.

The award in the submission between the Kirkintilloch Burgh Commissioners and the Gas Company, for the transference of the works and undertaking of the Company under the Burghs Gas Supply (Scotland) Act, was announced last Thursday. The arbitrators were—for the Commissioners, Mr. W. Foulis, Gas Manager, Glasgow; and for the Company, Mr. A. F. Wilson, Gas Engineer, London, and the award is as follows:—"The works are to be taken over as at 15th of May last. The Gas Company retain the right to all the outstanding debts, and meet the liabilities as at that date. The price to be £14,000, inclusive of everything, with interest thereon at 5 per cent. from date of transfer." The share capital of the Company was £7000, in 1400 shares of £5 each, being equal to £10 per share. The shares sold in the market at £10 5s. to £10 11s. 6d. As the award was expected two days previously, and the stock was held in a great measure by local parties, considerable speculation was afoot as to the result of the award. The arbitrators were so close in their estimates and calculations of the value, that the services of the oversman were not called into requisition.

At a meeting of the Arbroath Lighting Committee, held last Wednesday, it was unanimously resolved that during the coming winter the amount of gas to be consumed in the street-lamps should be 2½ cubic feet per hour, thus giving an increase of about one-third. It may be stated that the illuminating power of the Arbroath gas is 28 candles.

The Water-Works Committee of the Dunfermline Town Council have agreed that the rates to be charged for all supplies of water to persons or premises outside the parliamentary boundaries of the burgh, whether for domestic or other purposes, shall be the same as are charged within the burgh for the time being—the public rate to be charged in addition to the domestic rate in respect of dwelling-houses and offices, and the valuation on which rates are to be assessed to be fixed by the Collector on the same principles of valuation as are applied to houses within the burgh.

An arrangement has been entered into between the Markinch Local Authority and the Kirkcaldy and Dysart Water Commissioners for an adequate supply of good water to the busy and thriving village of Thornton.

Since last report there has been such an abundant fall of rain in the collecting-grounds for the Paisley water supply, that there is now no fear of its being necessary to cut off the supply to the public works of the town.

Mr. Ritchie, C.E., Perth, has been commissioned by the Comrie Local Authority to prepare plans, and to ascertain where, and at what expense, an ample supply of pure water can be obtained, and also to give a probable estimate of what a thorough system of drainage for the village would cost.

On Saturday week the new water-works for Burghead, near Elgin, were formally opened. The water is brought a distance of some seven miles, at a cost of about £3600. Mr. Mackay, of Elgin, was the Engineer.

The Inverkeithing Town Council have unanimously agreed to accept the offer of the Dunfermline Water Commissioners to give water from the main at Milesmark at the price of 3d. per 1000 gallons.

During the fortnight preceding the 27th of August the delivery of water into Edinburgh was at the rate of 4817·4 gallons per minute, equal to a supply of 23·71 gallons per head per day to a population of 292,500, the delivery at the same time last year being at the rate of 6230 gallons per minute. The water in store in the reservoirs was 263,892,864 gallons, as against 335,981,000 gallons on the 13th ult., and 700,678,753 gallons at the same time last year, when the whole of the reservoirs were full. From the 1st of January till the 27th of August the rainfall at Glencorse was 19·10 inches, as compared with 24·20 inches in 1876, and 39·75 inches in the same period of 1877.

The Glasgow pig iron market was again dull last week, and the price declined from 48s. 6d. on Monday to 48s. 3d. on Tuesday, rising to 48s. 7½d. on Wednesday, and making a further decline to 48s. 2½d. on Friday. There is a great want of animation and buoyancy, and the lower the price falls the depression appears to become more and more intense. Manufactured iron keeps steady. Most works are busy, and some are pretty well booked ahead. For the moment, this department is in a decidedly favourable position.

Orders for coal are very scarce, and some shipping lots at present have been taken at low prices. The house demand is supposed to be getting a little better.

WELLINGBOROUGH GAS COMPANY, LIMITED.—The annual meeting of this Company was held on Monday, Aug. 26, when a dividend of 10 per cent. on the paid-up capital was declared, and a balance of £206 13s. 5d. carried forward. It was considered advisable that steps should be taken to place the Company under statutory powers and regulations; and, as the old "guarantee-fund" was larger than the rules of the Board of Trade allowed as a "reserve-fund," it was decided that a portion of it should be divided among the Shareholders in lieu of back dividends, as the Company have only paid 10 per cent. for the last three years. It was also decided to reduce the price of gas to 4s. per 1000 feet, as from the 1st of July last, and to allow a discount of 5 per cent. on all accounts of £1 and upwards, if paid at the Company's offices within six weeks from each quarter-day. A call of £5 per share was made on the B shares of the Company. This will make the paid-up capital £17,500. It may be remarked that, with the assistance of Mr. W. Livesey (Secretary to the Gas and Water Companies Association), the accounts of the Company have been tabulated in the form prescribed by the Gas-Works Clauses Act of 1871.

HONITON WATER SUPPLY.—The Honiton Town Council, who have resisted the orders of the Local Government Board with regard to the water supply of their town, last Tuesday had another meeting, when the matter was again under consideration. Up to the commencement of this month the majority had passed resolutions, in which they declined to comply with the orders of the Local Government Board to improve the water supply. At the first meeting this month, however, some of the anti-water party were away, and the other side answered a letter of the Local Government Board by a resolution, admitting that no additions had been made to the water-works, and that the present supply was inadequate. This proceeding caused great excitement when the absentees heard of it, and the next week it was decided by the majority that the present supply was ample for all requirements, and this resolution was forwarded to the Local Government Board as the reply to their letter. On Tuesday last it was decided to rescind the resolution of the early part of the month which admitted the inadequacy of the supply, so that it is anticipated the Local Government Board will now take the supply in hand themselves, and charge the town with the cost.

NEWPORT (MON.) GAS COMPANY.—The half-yearly meeting was held on Monday, the 19th ult.—Mr. T. Gratrex in the chair. The balance of the half-yearly earnings, amounting to £3613 0s. 10d., enabled the Directors to recommend for payment the usual dividends, at the rate of 5 per cent. on class A stock, 3½ per cent. on class B stock, and 3½ per cent. on class C shares, for the half year ending the 30th of June. New coal sheds had been erected, also the railway weighing-machine. The retiring Directors, Mr. R. P. Jones and Joseph Firbank, offered themselves for re-election. Mr. John Cole, one of the Auditors, retired, but was eligible for re-election. The Engineer (Mr. T. Canning) reported that all the works were in a satisfactory condition. The Chairman congratulated the Shareholders upon the Company being enabled to declare, from net revenue, the full dividends for the half year, as allowed by their Act of Parliament. The Directors

had made a call of £1 per share on the C shares, payable on the 1st of October, and the remainder would be called up early next year, to meet the amount required for the purchase of land on the new site of future works. The Directors had also concluded a contract for the public lighting, for the term of three years, with the Local Board of Health. A vote of thanks was cordially passed to the Chairman and Board of Directors for the very satisfactory manner in which they had conducted the affairs of the Company.

PARTICK, HILLHEAD, AND MARYHILL GAS COMPANY.—The ordinary general meeting of the Shareholders was held last Friday, at Glasgow—Provost Cowan in the chair. The report of the Directors proposed a dividend at the rate of 5½ per cent. on the preference shares, less income-tax; a dividend of 4½ per cent. on the ordinary shares, free of income-tax; and that the balance of £255 0s. 8d. be carried forward. During the past year 3892 yards of new mains had been laid to meet the requirements of the several districts of supply. The business of the Company was steadily on the increase—there being 8627 meters now in use, as against 7772 on the 30th of June, 1877. In the past year an additional gasholder at the works was completed, giving, along with the one formerly used, a total storeage of 1,000,000 feet per day. The present retort power was in excess of this by a quarter of a million, the productive power of the works being fully commensurate with the present and prospective exigencies of the time. The Chairman, in moving the adoption of the report, congratulated the Shareholders on the increase of their dividend to 4½ per cent. this year, as against 4 per cent. last year. Mr. Paton seconded the motion, which was unanimously adopted. Mr. Wilson moved that the retiring Directors—Messrs. Henry Cowan and John Ferguson—be re-elected; and that Mr. Robert Young be elected in room of Mr. Govan, retired. This motion also was agreed to. On the motion of Mr. Mathie, seconded by Mr. Barclay, 100 guineas were voted as an honorarium to the Directors for their work in connection with the Company.

THE DRAINAGE OF WINDSOR.—After many delays, the new drainage system for the borough of Windsor is now complete. The Town Council, acting as the Sanitary Authority, have entered into a contract with Mr. Hillé for the treatment of the sewage by the process known as "Hillé's system," and in a few days the new works will be in operation. It is now more than ten years since the Windsor Town Council were served with the first notice, under the Thames Conservancy Act, to discontinue the drainage of the town into the River Thames. Having only about ten years before constructed a system of drainage at a heavy cost, this new responsibility fell heavily upon the town. The Corporation at once set to work with a view to devise some new system; but the town was so hemmed in by royal property that every proposed site for drainage works was strongly opposed. About three years ago a piece of land was obtained on the Ham at Old Windsor, about two miles distant, and adjoining the Castle Sewage Farm, where it is intended to treat the sewage by a combined system of precipitation and filtration. Under the direction of Mr. Hawksley, C.E., a new outfall sewer, from the point where the existing sewers concentrate to Old Windsor, has been constructed, crossing under the navigation out to the Ham. This has been a work of great difficulty. A portion of the sewer has been constructed in a tunnel; but at Old Windsor it had to be laid in a cutting in a wet sandy soil, at a depth of over 40 feet. The tanks on the Ham are very extensive, and the buildings are most substantially built. The cost of the works, it is estimated, will be about £40,000. The money has been borrowed, on the usual terms for such works, from the Public Works Loan Commissioners, repayable, by equal annual payments, in 30 years. Mr. Hillé, who is to be paid a royalty of £50 a year, will manage the works for a short time at his own charge, and will then hand them over in full operation to the Town Council. The elimination of the Windsor sewage from the Thames will very nearly complete the task of purification above the intakes of the Metropolitan Water Companies.

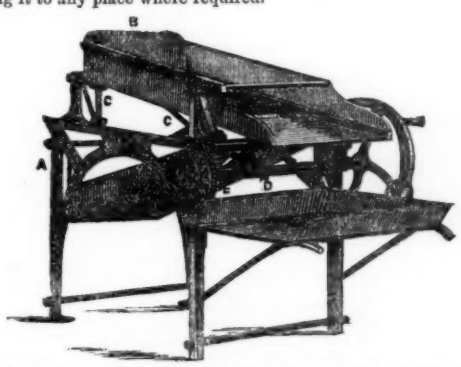
HEYWOOD GAS SUPPLY.—The following report of the Manager of the Heywood Gas-Works shows the progress of gas making in Heywood since the Local Board acquired the gas-works, and also the relative increase in the capital invested, as compared with the increased productive capacity of the works during the proprietary of the Local Board:—"The Local Board purchased the works in June, 1867, for £33,500. The previous year's production was 32 millions of cubic feet of gas, which, upon £33,500, would cost at the rate of 21s. per 1000 cubic feet of production. The following year the production had increased 2½ millions, with an outlay in capital of £2041. In the years 1868 to 1878 the gas production has increased by 31½ millions of feet, and the capital by £16,230, or equal to 10s. 4d. per 1000 feet. One-sixth at least of this new capital was expended in the formation of roads, boundary walls, &c., so that not more than £13,500 would be expended in the production and distribution of gas during the 11 years that the works have been the property of the Board, and this amount is equal to 8s. 7d. per 1000 feet (an unprecedented thing), and equal to a saving of £19,556 to the Board when compared with the original purchase price. From the year 1871 to 1878 the consumers had a new clear benefit, in discounts on small accounts, amounting to £8678. The total net profits had been £6773. The illuminating power during three-fourths of that time will have averaged two candles higher, thereby making the consumers accounts less in proportion (on an average of 48 millions of feet), by £720 per year, and for eight out of the eleven years the extra illuminating power would be equal to £5760. It should also be borne in mind that where an old street has been sewered and paved the original mains and services have been renewed, and in very many cases their capacity increased as much as fourfold, and every new street formed since 1867 has had services laid of larger size, which will serve for a generation. In these extensions the street-lamps have been an important item, removals having been made and services removed when streets have been formed or reconstructed free of expense. When the Board took the works the burners in the street-lamps were No. 3's. They are now No. 6's, which incurs fearfully increased consumption of gas over what is paid for, and increased leakage, and 10s. per annum per lamp will not cover these two items, which on 570 lamps is £285 per annum, and for eleven years £3135."

EXHIBITION OF GAS COOKING-STOVES AT ELLAND.—In the course of last month the Elland Gas Company issued a circular to their consumers, announcing that in consequence of the general adoption of gas for cooking purposes in all large towns, the Company, in conjunction with Messrs. Wright and Co., of Birmingham, intended to hold a small exhibition of gas-stoves, at the National School-Room, Elland, on Wednesday and Thursday, the 21st and 22nd of August. The Secretary and Manager of the Company (Mr. W. A. Walker) was the chief promoter of the exhibition, which, from all accounts, was exceedingly successful. The *Halifax Guardian*, referring to it, says: "Most prominent in the display was the complete gas cooking-range, which has taken two prize medals at the only shows where it has been exhibited. The joint is placed in the bottom compartment, and is roasted by reflection, whilst other comestibles may be cooked with rapidity and cleanliness. Another class of stoves was that in which the gas was inside the oven, whilst in heating-stoves the Imperial ventilation stove was exhibited. The prices of all classes are very moderate, and the cost of heating is less than is the case where coal is used. Baths are also heated by gas, and small hand stoves for the making of tea, coffee, &c., were shown in variety. We believe that the Leeds Corporation are endeavouring to arrange for a very large number of this kind of stove, to present to the cottagers, for the encouragement of the consumption of gas." The respective merits of the different styles of stoves were well tried, especially upon the first day, when an excellent dinner was cooked, and served to the following gentlemen:—Mr. Richard Walker (Chairman), the Rev. F. Musson, Mr. Robert Dempster, Mr. Carr (Manager of the Halifax Gas-Works), Mr. Saville (Manager of the Sowerby Bridge Gas-Works), Mr. G. E. Wright, Mr. J. Beaumont, Mr. John Wilson, Mr. Briggs Denton, Mr. W. Etherington, and Mr. W. A. Walker. After the enjoyment of an excellent repast, the usual loyal toasts were honoured. "Success to the Exhibition" was then proposed by the Chairman, and responded to by Mr. Wright; after which "The Elland Gas Company" was given, in conjunction with the name of the Chairman, who replied. The remaining toasts were "The Visitors," proposed by Mr. Dempster, responded to by Mr. Carr and Mr. Saville; "The Secretary and Manager at Elland," proposed by Mr. Saville, responded to by Mr. W. A. Walker; "The Rev. F. Musson," who granted the free use of the school-rooms for the purpose of the exhibition, proposed by Mr. W. A. Walker; and "The Chairman," proposed by Mr. J. Wilson.

Register of New Patents.

1426.—PRICE, W. E., Gas-Works, Hampton Wick, "*Improvements in screens or sifters.*" Patent dated April 12, 1877.

This improved screen or sifter is mounted on a cast or wrought iron frame, which is well supported by suitable bolts and stays, and to which four links, about 8 inches long, are attached by means of bolts and nuts, which secure the links to the frame at the top ends, whilst the bottom ends are bolted to the screen in such a manner as to allow it to move backwards and forwards by turning a wheel, to which a crank-shaft is attached, giving motion to the screen. Below the screen is attached a sheet-iron tray, which moves in the same manner and at the same time, for the purpose of conveying the fine material into a barrow at the back part of the machine. A second screen of a finer mesh may be attached beneath the top one, if needed, by means of small links, in which case the sheet-iron tray would be below, and each shooting the sifted material in opposite directions into barrows placed at each end of the machine. The improved screen or sifter is so constructed as to be mounted on two wheels at the hind part if needed, and with handles in front, for the convenience of removing it to any place where required.



The following is a description of the machine and its action:—It is mounted on a cast-iron frame, A, which is well supported by suitable bolts and stays; the sieve, B, being on the four swinging links, C C, which are attached to standards on the cast-iron frame. A backwards and forwards motion is given by means of the crank and connecting-rod, D, which are moved by the spur and pinion, E, the fly-wheel being attached to the other end of the spur-spindle.

In screening breeze, the coarse material falls on a tray supported by the handles of the machine, thus making it convenient for picking the clinkers from the same, whilst the fine falls on a shoot behind, which is fixed to the bottom of the sieve, B. In screening gravel or other material, the coarse will fall into a barrow direct, and the fine conveyed by the shoot into a barrow at the other end or at the bottom.

1427.—CHEESBROUGH, F. J., Liverpool, "*Improvements in and appertaining to apparatus for lighting gas-lamps, cigars, and for other like purposes.*" A communication. Patent dated April 12, 1877.

This invention consists chiefly in a novel combination and arrangement of a cylindrical magazine, a spring hammer, and a feed and cam piece in conjunction with a paper tape that is pierced at regular intervals with pellets of percussion composition, which will give out fire when struck.

The first part of the invention has for its object the combining of the lighting apparatus with a gas-cock and burner in such a manner that when the key is turned to permit the flow of gas at the burner, the lighting apparatus will be operated so as to fire a percussion pellet and ignite the gas.

The second part has for its object the combination of the lighting apparatus with a standard and an operating lever in such a manner that it may be readily applied or connected to gas-burners (in common use) as an attachment for lighting the gas, after it has been turned on so as to flow at the burner.

1480.—SHAW, J., Lockwood, near Huddersfield, "*A new or improved union or joint for pipes.*" Patent dated April 16, 1877.

This invention consists in making a union or joint for pipes, consisting of two nuts or collars with flanges, having holes for the insertion of bolts or screws. On the face of one part is a projection, which enters a corresponding recess on the other part, forming a gland or tight joint without the use of packing. The two parts of the union are screwed or otherwise secured on to the ends of the pipes to be joined, and are then placed together and fastened by bolts passing through both flanges, and secured by nuts on the ends thereof.

1533.—LAKE, W. R., Southampton Buildings, London, "*Improved apparatus for lighting and extinguishing gas.*" A communication. Patent dated April 19, 1877.

This invention relates to an apparatus for igniting and extinguishing gas jets automatically, and is operated both in lighting and extinguishing by alternately increasing and diminishing the pressure of the gas supply. It is more particularly designed for use on lamps in streets or such like public places, but may be adapted to large halls and other buildings.

For operating street or other similar public lamps, the pressure is increased or diminished as desired by means of the governor or regulator used at the gas-works to determine the pressure at which the gas is deli-

vered. For halls and other buildings the operating pressure is obtained by means of a compressor or chamber interposed between the meter and the burners.

To make varying pressures available in lighting and extinguishing gas, a gas-chamber is used, capable of being expanded or diminished in capacity, on the one hand, by increasing, and, on the other, by decreasing the gas pressure. The chamber is so constructed that the changes of capacity are effected with a very slight amount of friction, while the power developed is utilized in opening and closing gas-ports in such relation to each other that a small jet is left burning, suitably protected from the wind and other disturbing agents when no light is wanted, and a large jet is ignited and the small one extinguished when light is wanted.

The apparatus may consist of a cylindrical cup of iron, glass, porcelain, or other suitable material provided with a coupling at the bottom to connect with the gas-pipe or service for the supply of gas, and having double vertical side walls forming an annular space. Another cup having a diameter greater than the inner wall, and less than the outer wall of the first-named cup, is used as a cap or cover to the same, its walls occupying the annular space of the first-named cup. This annular space is fitted with a sealing medium, such as mercury, glycerine, or any fluid not liable to congeal or evaporate at ordinary temperatures; and within the chamber thus formed are cells also charged with a sealing medium. To the top of the second inverted cup are secured pipes, their lower ends being so adjusted that, when the cap is raised or lowered by the increase or decrease of the gas pressure, it has also given to it a partial rotary motion, which will seal and unseal the inner ends of the pipes in the cells. The outer ends of the pipes are provided with burners, one to burn as small a jet as possible, and to be maintained only when light is not wanted, and to fire an intermediate jet, which burns with a long slender flame. This jet in turn fires the main burner. When the latter is lighted the pipe supplying it is left in communication with the gas space or chamber outside the sealing cells, and remains burning while light is wanted, the other two pipes dropping into their respective cells. The gas is cut off by being sealed in the cells and extinguished.

If it is desirable to make the upper cup or cap as light as possible. The burner or jet pipes need not be attached to it, but may be adjusted above the cap, and thence carried downward outside the outer case, and up through the bottom, passing through the bottom of the sealing cells, their ends terminating above the sealing medium. Small caps are then secured, mouth downward, to the inside of the roof of the moveable cap, so as to shut over the jet pipes and into the cells charged with sealing medium.

To still further reduce the resistance to the gas pressure, if mercury is the sealing medium, the thickness of the immersed portion of the upper cup or cap is increased, and an air-tight space is formed within, and by these means such conditions are established that from 3-10ths to 5-10ths of pressure above the maximum required for ordinary gas lighting will suffice to operate the apparatus.

1542.—Hislop, G. R., Paisley, "*A new or improved mode of, and means and chambers for calcining or revivifying spent lime.*" Patent dated April 20, 1877.

This invention has for its object the recalcination or revivification of the spent lime which has been used in gas-works for the purification of illuminating gas, or in similar processes, whereby such lime is rendered equal to fresh lime, and may be re-used for several times in succession, thus economizing the cost in lime for such processes, and, at the same time, utilizing what has heretofore been thrown aside as a waste material.

The calcining chambers are constructed in sets of two or more, preferably four, side by side, or over each other, and of any convenient dimensions, either through and through or close ended, with one or more furnaces, and about 9 feet long, 2 feet 6 inches wide, and 9½ inches high, and over one furnace; the first three being the calcining chambers, kept at high heat, and the fourth, or top one, a drying chamber, and having a capacity fully equal to the united capacity of the three lower or calcining chambers. The chambers are constructed of fire-clay tiles and blocks of similar form.

The gases from the furnace pass to the end of same, where they enter by two ports into the lowermost calcining chamber at the corners, and, passing along the chamber over the top of, and in close contact with, the spent lime or limestone to be calcined, to the front of same, where, passing up through two ports as before, one being on either side, traverse in like manner the second chamber, and so on, till the last one, called the drying chamber, thence to the main flue, at the entrance to which it is regulated by suitable dampers.

In carrying out this invention the spent lime or other material to be calcined is charged into the top, or drying chamber, by means of a hopper or other feed arrangement, or by shovel, from the floor, or from waggons, in which it remains during the calcination of the contents of the chambers beneath, and after the latter have been discharged into an iron waggon or barrow, the contents of the upper, or drying chamber, are discharged into the lower chambers through a port near to the front of each, and which is covered with a suitable tile as the chambers are successively filled, commencing at the bottom one, and the gases from the furnace pass over and in close contact with the spent material, disengaging the carbonic acid and other impurities.

In order to ensure complete combustion of the fuel (which may consist of the coke of cannel coal, breeze, or coke from coking coal, or dross, or a combination of these or other solid or liquid fuel) air is admitted through ventilating flue-boxes, placed on either side of furnace near to the ground, whence it is conveyed to, and directed against, the fuel in the furnace near to the centre of the furnace-bars, where it issues from a number of holes about 1 inch in diameter, each pierced through fire-clay blocks, which compose part of the sides of the furnace, the air-holes passing through blocks with a dip of 1½ inches, more or less, towards the furnace bars.

As a means of economy, it is provided also that the waste gases from the retort furnaces or steam boilers may be utilized, in assisting the process of calcination of the spent lime or limestone, by passing the same through the calcining chambers, wholly or together, with the gas from the furnaces below the chambers, the draught being assisted by fanners or ordinary blowers, in order to suitably effect this object.

1547.—Janig, H., Sherwood, near Nottingham, "*Improvements in machinery for cooling liquids, vapours, and gases, and for condensing steam and vapours.*" Patent dated April 20, 1877.

This apparatus consists of an outside case, made either of cast iron, copper, or any other suitable material, either cylindrical, square, or any other convenient shape. Within this is an inside apparatus capable of revolving round its own axis, and composed of two chambers jointed together by a cylinder, but within which no communication exists between it and the chambers. A series of thin copper tubes are connected to the two chambers, and form a communication between them. These pipes are placed preferably in concentric circles, as close together as convenient, according to the quantity of liquid, vapour, steam, or gases, to be operated upon in a certain time.

The liquid, steam, or gas enters at the top through a pipe, and passes through one of the chambers, thence through the series of copper tubes to the lower chamber and the outlet-pipe, away from the revolving apparatus.

A stopcock is fitted to the outlet-pipe, outside the casing, for regulating the quantity passing through, a similar cock being fitted at the top supply-pipe. Thus by regulating the outlet-cock, the whole of the interior revolving apparatus can be always kept full of liquid.

The outer casing is supplied with cold water by a pipe at the bottom, and rises to an overflow-pipe at the top.

The cold water feed-pipe is provided with a stopcock to regulate the water supply, the outer casing being also kept filled by the supply of cold water, which impinges against the chambers and the copper pipes of the apparatus which are charged with the liquid to be cooled. By this means a large surface is exposed to the cold water, and rotary motion being given to the interior apparatus with its great number of tubes, will then constantly change the contact surface of the cold, and rapidly absorb the heat of the liquid, steam, or vapour.

The cold water which enters the apparatus through its pipe gradually becomes warm, and leaves the apparatus through the upper pipe.

Motion is given to the revolving apparatus within the casing by means of a pulley fixed on the inlet trunk-pipe in any suitable manner.

It is not necessary that the inside apparatus should revolve at a great speed; all that is required is to move the tubes through the surrounding cold water so as to change the surface contact, and thus greatly increase the cooling effect. A few vertical ribs are arranged within the casing, projecting from its side or sides, to prevent the water, as a body, moving round inside the casing while the tubes and chambers are revolving.

The liquid is regulated to run out of the apparatus at a certain rate, and this, coupled with the total area of the inside of the tubes, being so many times larger than the area of the exit-pipe, it follows that the liquid or fluid inside the tubes will pass down comparatively slowly, and be the longer exposed to the surrounding cold water.

1587.—Kidd, J. and J., Wandsworth, "*Improvements in carburetting gas and air.*" Provisional protection not allowed. Application dated April 24, 1877.

This invention relates to apparatus for charging gas or air with the hot vapours of liquid hydrocarbons, and consists in the heating of the pipes through which the carburetted gas passes, and in the method of regulating and applying the heat to the carburetting vessel.

For applying heat to the gas carburetting vessel, a flame of uncarburetted gas, taken from the pipes before entering the carburettor, is used, as by this means an invariable heat can be obtained.

When the construction of the carburetter necessitates its being heated by a cluster of carburetted jets burning underneath, a deflector of metal is used, so constructed that when placed in a certain position all, or nearly all, of the heat from the burners can be deflected, or caused to pass around the sides of the carburetter without heating it. On slightly turning this deflector, more heat may be applied, and, on placing it in another position, the whole, or nearly the whole, of the bottom of the carburetting vessel is exposed to the action of the heat.

When carburetting sunlights or clusters of jets, or where a number of gas-jets are fixed in a row on one pipe, it will be found necessary to heat the gas-pipes by placing one or more gas-jets under the pipes, and so arranged that the heat given off will impinge on the pipes, which may be covered with a curved piece of sheet-iron to better retain the heat.

In places where it is not practicable to use gas for heating the pipes, the gas-pipe is placed inside a hot-air flue or pipe, so arranged that a constant current of hot air can be carried through it; or steam may be substituted for hot air by placing the pipe containing the carburetted gas inside a steam-pipe. Steam is sometimes used for heating the carburetting vessel when it has to be placed in a situation where a light burning under it would be objectionable.

1592.—Newton, J., Longport, Staffs, "*Improvements in apparatus for regulating the supply of gas to gas-burners for street-lamps and other purposes.*" Patent dated April 24, 1877.

The object of this invention is to obtain a regular supply of gas in the burners, notwithstanding any irregularity of pressure in the mains.

The apparatus consists of a vessel fixed to the supply-pipe, and in it are two flexible diaphragms supporting a metal tube, to the lower end of which is attached a valve. The seating of this valve is formed in the lower part of the vessel, and the lower end of the metal tube is perforated, the upper end being in direct communication with the pipe leading to the burner or burners. The gas from the main passes direct to the lower side of the bottom diaphragm; then through the perforations in the lower end of the hollow tube, direct to the upper side of the top diaphragm, and thence to the burner or burners. When the pressure of the gas in the main is in excess, the valve is partially closed by the action of the gas on the bottom diaphragm, thereby reducing the supply.

1611.—Dalziel, S., Kilmarnock, N.B., "*Improvements in gas-meters.*" Provisional protection only obtained. Dated April 25, 1877.

This invention refers to a more simple and efficient mode of, and certain new or improved means or appliances for preventing the drawing or draining off of the water from, or the tampering with, wet gas-meters by the consumers, and also the preventing of the gas from passing through such meters without being duly measured and registered.

The improvements consist essentially as follows:—In lengthening the inlet bent tube or pipe, which conducts the gas through the central opening in the front end of the revolving drum into its internal measuring chambers, so as to receive the gas at the upper extreme front part of the waste water chamber, or compartment formed at the lower front part of the meter, by its lower open end passing or dipping a little into this chamber through its upper division or plate, separating it from the usual supply water space and the gas inlet float-valve space above it, and preferably (as in most meters in use) separated by a vertical gas-tight division down to near the bottom of these spaces, so that the water can rise to the same normal level in both chambers, when the pressure of gas above remains the same in both. This level is regulated, as usual, by the combined overflow stand and inlet gas-tube leading from the inlet chamber down to the waste water chamber below, from which the gas flows up the lengthened pipe close to the upper and front side. The end of this pipe is fitted with a valve on the end of a two-armed or bell-crank lever, fulcrumed near the knee-part to a pendent joint-piece at the back of the top of the chamber, and fitted transversely so that the valve remains open when the meter is standing level on its base in proper working order, but so that the moment it is tilted forward the weight on the pendent arm of the lever would press the horizontal arm up and close the valve, so that no gas could escape from the chamber into the measuring-drum or cylinder. The closing of this valve also increases the pressure of the gas in the waste water chamber and in the supply chamber, so as to press the water down below the top of the overflow-pipe, and prevent its escape from the chamber, and raise the level of the water in the water supply chamber. The float-valve closes the gas inlet-valve as the level of the water falls in the first chamber and stops the supply of gas to the meter, while the water rising in the other chamber and case of the meter prevents the measuring-drum from indicating more gas than passes through it in this

angled position. Before a meter, therefore, fitted with these additions or improvements can be made to work, it must be set level on its base, with the water inside at its normal proper level, thus effectively preventing the passage of more gas than is actually measured and indicated.

1626.—PEEBLES, D. B., Edinburgh, "*Improvements in apparatus for governing or otherwise acting on the flow or pressure of illuminating and other gases or vapours, and in part relating to the testing of gas and gas apparatus.*" Patent dated April 26, 1877.

This invention comprises various improvements in constructive details, and in the modes of combining the parts of gas apparatus, and has generally for its objects the better governing or otherwise acting on the flow or pressure of illuminating and other gases, and the accurate and rapid testing of gas and gas apparatus.

One piece of improved apparatus may be termed a two-pressures or day and night controller, and is to be applied to a large governor for a district or the like, such large governor being of any of the kinds described or referred to in the specification of letters patent granted to the present applicant, and dated June 26, 1875 (No. 2328), or of the improved kind hereafter described, or of any other suitable kind in which the pressure of gas on one side of a bell or diaphragm is opposed, or partly opposed, by the pressure of gas or air on the other side. This controller may be fitted up close to the governor, or in the Engineer's or Manager's office, or in an ordinary street-lamp, and at any reasonable distance from the governor, like the small governing or controlling apparatus described in the earlier specification. Instead of gas continuously passing into and out of the space in the governor, as in former arrangements, it is saved in the daytime with the new apparatus. In it a small pipe is connected to the burner tube of a street-lamp, or to any tube having a small orifice between the stopcock and burner or orifice, and this pipe is led to the large governor.

When the stopcock is shut, as during the day, the atmosphere alone has access, by the burner or other orifice and by the added pipe, to the district governor, which is adjusted by weights to give the minimum or day pressure when the atmospheric pressure acts on it. In the evening the stopcock of the controller is opened, and the gas having sufficient pressure for issuing from the burner or orifice, and which is necessarily greater than that of the atmosphere, causes an increased pressure to be transmitted along the added pipe to the district governor, and thereby makes it allow the maximum or night pressure to pass. A small governor is by preference applied for regulating the pressure of gas which passes to the burner or orifice and added pipe, and a small stopcock or screw-plug may be fitted to the tube having the burner or other outlet orifice. In general, however, the desired issue of gas may be obtained by selecting a burner of a suitable size. The Engineer or Manager has thus the choice of either keeping his district governors connected with the station-governor in the daytime, and with gas continuously flowing through the burner or orifice, or of cutting off all connection, and, whilst saving gas, making the change of district pressure depend on the mere turning on or shutting off of the gas of a public lamp or other suitable outlet.

The two-pressures controller may be modified to suit various situations and purposes, and the larger governor may be arranged to entirely shut off the gas when the pressure acting on it is that of the atmosphere only.

In the improved governor, suitable for large as well as small sizes, an equilibrium or double-beat valve arrangement is used, but that one of the two valves or discs which moves from the inlet space into the governor chamber or outlet space is made with a cylindrical shell or extension, so as not to appreciably open its port when only slightly moved from its seat. This will prevent the vibration of the valves, which is apt to occur when a comparatively small quantity of gas passes, and will maintain the inlet pressure on the valve which moves out of the inlet space.

In some cases the cylindrical shell or extension may be large enough to always keep within the valve-seat almost all the gas passing the other valve.

In a dry governor the valves will be connected to a diaphragm placed either above or below them, and loaded in any suitable way.

In a wet governor the floating bell to which the valves will be connected will, in some modifications, be below them, the outlet or governed pressure acting on the top of it, whilst atmospheric air or gas from the inlet, and regulated by a stopcock or small governor, or both, acts inside it. A tube extends up from the top of the bell, and whilst forming the spindle of the valves, is continued above them through an aperture in the top of the chamber, which aperture is sealed by a liquid joint into a small chamber at the top, thus avoiding pipe connection swith the bottom of the governor in cases in which such connections are not desirable,

When the governing pressure is that of gas, which is itself governed, a small outlet is required for it, as explained in the earlier specification before referred to. By the present invention an additional small governor is applied to the outlet, for the purpose of securing nicer adjustments when the gas passing through it is not led into the main outlet-pipe, and it secures an invariable size of flame, which can be used for a jet photometer or for testing for sulphuretted hydrogen or carbonic acid.

In another modification, the floating bell is arranged in a chamber above the equilibrium valves, the valve spindle being connected to it through a liquid joint.

In another modification of governor, an equilibrium valve arrangement is formed by attaching or connecting to the top of a floating bell a hollow valve closing down on the upper and outer side of a seat, which is in the form of an annular flange on the bottom end of the outlet tube which projects down from the top of the governor chamber. The float may be counterbalanced like that in the preceding modification, or by means of weights, or counterweighted levers may be used to give increased bouyancy.

In the apparatus for testing gas and gas apparatus, such as burners and lamp-governors, and which is advantageously applicable for other purposes, such as testing one kind of gas at different pressures simultaneously, or mixing one stream of gas or vapour with another stream of gas or vapour or air in definite proportions, two gas-meters of any suitable known kind are combined, and spindles, turned by the actions of the two meters, have gearing and pointers, or a pointer and a dial, connected with them, so that the action of each can at any time be compared at a glance, and the stop valves be adjusted to give equal or other desired relative flows through the two meters.

In one modification, the horizontal spindles of the drums of two ordinary wet meters are geared by bevel and spur wheels, so as to move, the one a tubular spindle carrying a disc or dial, and the other a spindle passing up the tubular spindle, and carrying a pointer or arrow. Then any difference of motion of the arrow and disc will show a difference of flow (if the meters pass the same quantities per revolution), whilst the relation of the two motions to a fixed point will show the rates of flow.

In another modification, the motions of the two meters are communicated to two discs revolving in opposite directions, and having between them two or more wheels on radial axles, which axles are attached to a spindle passing through the centre of one of the discs, and carrying a pointer. When the discs move at equal speeds, the wheels between them are simply turned on their axles; but when the speeds of the discs are unequal, the wheels will be carried round as well as turned, and by moving the axles and pointer will indicate the difference between the speeds.

When the combined meters are used for mixing two streams, the drums or equivalent parts are geared together, so that they can only act so as to pass the desired relative quantities, the gearing being proportioned to suit such quantities. If one of the streams has less pressure than the other, or, as in the case of atmospheric air, no effective pressure, the meter it passes through will be driven by the other meter, so as to draw in and pass the required proportional quantity; or power from any suitable source external to both meters may be applied to drive them.

1632.—WEATHERHOGG, G. W., Camberwell, Surrey, "*Improvements in apparatus for carburetting atmospheric air.*" Patent dated April 26, 1877.

This invention relates to improvements in the construction of those types of carburetting machines in which atmospheric air is forced through a light hydrocarbon liquid, preferably gasoline, by means of volute drums or other analogous mixers, whereby the air becomes impregnated and mixed with the vapour arising from the hydrocarbon, by the combination of which an illuminating gaseous body is obtained, capable of producing a flame of great brilliancy for lighting and heating purposes.

The objects of the invention are—

1. To produce uniformity of quality in the gas produced.

2. To obviate the difficulties hitherto experienced in air gas machines, resulting from condensation in the service-pipes.

3. To maintain a uniform and constant pressure at the burners, both when the machine is working to its full capacity and with one light only.

4. To obtain an illuminating power in the light produced by the combustion of carburetted air that hitherto has not been equalled except by the calcium or electric light.

1644.—CUTLER, S., Millwall, "*Improvements in apparatus used in the purification of gas.*" Patent dated April 27, 1877.

This invention has reference to the construction of washers, and has for its object such an improved arrangement of the various parts as to ensure, with greater convenience and certainty, the more complete removal of the ammonia, and other impurities contained in unpurified gas, than is now commonly done.

The apparatus consists of an upright, circular, or other conveniently shaped vessel, wherein a number of shallow annular ledged trays are fitted one above the other, and fixed to the sides of it. Above each tray is another shallow annular tray, but of less diameter. This tray has a rim or side attached to it, and is serrated at its bottom edge, on which it rests in the tray immediately beneath it, and it may also have one or more other flanges or projections therefrom, similar to the other rim or side.

The serrations may be slightly less in depth than the tray in which it stands for the first, second, or third tier, but in all the upper tiers the serrations are slightly deeper than the trays in which they stand. Over each of the central openings in the trays last described, a cover, having a perforated rim, is placed, the lower edge of the rim standing on the tray immediately beneath it. At the top of the washer an annular water-tank is formed, and around it is an outlet chamber provided with an outlet for the gas.

In the centre of the top plate is a spindle that operates upon a very taper or needle-shaped plug-valve, the raising or depressing of which causes a greater or lesser quantity of water to be admitted to the vessel. The valve itself is supported by hollow arms through which water flows to the valve, and are fixed to the bottom of the water-tank. Beneath the nozzle of the valve is either a flat, concave, or convex disc, supported by arms attached to the tank, so that the water that falls from the valve may impinge upon it, and be converted into spray. This disc is so arranged as to be adjustable and removable.

The action of the apparatus is as follows:—Water or other liquid being supplied to the tank, it is allowed to pass through the valve to the nearest tray beneath it, and when charged, the surplus water runs through the perforations (if any are made), or over its top edge, into the tray next below it. From thence, the further surplus water will fall into the next tray, and so on throughout the series. The gas is admitted at or near the bottom of the washer, and after forcing its way through the water and under the upper part of the serrations in the rim, travels over the surface of the water in the trays above to the next tray having a serrated rim. Here it passes over the water and through the space left between the surface of the water and the top of the serrations, and from thence proceeds in the same order and manner throughout the whole series of trays until it reaches the top, where it is led off at the outlet to the purifiers or other apparatus used for purification.

If the disc is used, the water will be converted into spray before falling into the trays. It will, however, soon condense, and fill the upper trays, when the water will descend from tray to tray, as before described.

1645.—MORRIS, F., Brentford, and CUTLER, S., Millwall, "*Improvements in gas-condensers.*" Patent dated April 27, 1877.

This invention, having reference to condensers used for cooling gases or vapours, is especially applicable to gas used for illuminating purposes, and has for its object the provision of means whereby the cooling can be regulated to any desired temperature.

The apparatus consists of a series of pipes arranged in tiers of such numbers, calibre, and length as the quantity of gas or other vapours to be cooled render necessary. Each tier of pipes is connected at the ends to those above and below it respectively, by U-shaped bends, breeches pipes, or other suitable connection, thus forming a worm or coil of piping continuous from bottom to top, each tier being laid with an inclination so that the resulting liquids may flow towards the bottom. The pipes may be supported by placing blocks, saddles, or crutches between them by columns on each side of them, or by columns on one side and a wall on the other, with girders extending from column to column or from column to wall, as the case may be; the pipes resting thereon. This arrangement of the pipes is not necessary, since they may be placed vertically, or in a continuous cylindrical, square, or other shaped coil or worm.

Within the pipes one or more smaller pipes are made to traverse, the calibre depending on the quantity of gas the condenser is designed for. If there is only one interior pipe, it is placed preferably as nearly as possible in the centre; if more than one pipe, at such distances from the centre that the sectional area surrounding each pipe shall be as nearly as possible equal. The inner pipes, the same as the outer ones, are continuous from end to end of the coil, and are kept in position by stays or hooks projecting at intervals from the inner sides of the outer pipes.

The lower end of the inner pipe or pipes is connected to some source of water supply that will afford sufficient pressure to force the water through the inner pipe to the top of it. Where the supply of water is attendant with but little trouble or expense, the water contained in the inner pipe or pipes, after passing through and out of the top, is brought down again and allowed to run to waste; but where water is valuable, a tank is provided and fixed above the top of the upper pipes, and supported either therefrom or from the columns; or a tank may be fixed at any other convenient part of the premises, the inner pipe or pipes being led into it so that their contents may be discharged therein, thus providing a supply of water at such pressure as would be due to the elevation of the tank, and available for the general purposes of the gas-works. The water so discharged into the tank would be raised in temperature consequent upon

the heat absorbed from the gas or other vapours passing through the outer pipes.

Where it is desirable that the water should be cooled again, the tank is so arranged that by a number of vertical division-plates, each being perforated at, or descending to within a short distance from the bottom, the water may be taken from the opposite end to which it was admitted, and, consequently, much cooler than when it entered.

A cock or valve is attached to the lower end of the inner pipe or pipes for regulating the quantity of water that shall flow through them, thus controlling the speed and extent to which the gas is cooled.

Where a very low temperature is required, the water may be first refrigerated, or some other liquid producing a low temperature may be employed.

A multiple-way cock is also provided at the inlet end of the inner pipe or pipes, or the cock already referred to may be so constructed that by partially turning it in one direction the water may be shut off entirely, and the pipe or pipes opened to the atmosphere, the discharge-pipe being carried above the orifice which serves for an inlet to the tank. The cock and connections can also be so arranged that, if the supply of water temporarily fails, the water in the tank will run through the inner pipe or pipes.

The open ends of the U-bends or breeches pipes are covered by removeable plates or lids, and, in order to remove them conveniently, sliding bars, cantilevers, or cranes, are attached to the upper part of the apparatus, so that the lids may be raised or suspended therefrom with facility, the bars, cranes, or cantilevers being so arranged as to slide or swing back into recesses for their concealment.

The action of the apparatus is as follows:—Water or other cooling liquid is pumped or passed through the inner pipe or pipes contained in the outer ones, and ultimately falls into the tank or run to waste, as the case may be. The hot uncondensed gas enters at or near the top of the large pipe, and through the whole winding course of its passage to the bottom or outlet, it is subjected to the cooling influence of the water contained in the small pipes. As the water flows through the small pipe it will become warmer as it rises to the upper part where the gas is the hottest, and the hot gas will become cooler as it descends to the outlet at the bottom, where the water is the coldest. If found more convenient, the gas and water may be caused to flow in the opposite directions to those before indicated—that is to say, the gas may enter at or near the bottom of the outer pipes, and the water at or near the top of the small or inner pipe or pipes. It will be observed, however, that in either case the gas and water are always flowing in opposite directions.

APPLICATIONS FOR LETTERS PATENT.

3322.—Bodart, A., Huy, Belgium, "Improvements in joints for pipes or tubes." (Complete specification.) Aug. 23, 1878.

3334.—Atkins, T., Clapham, London, "Improvements in the construction and arrangement of machinery and apparatus for the manufacture of compound carbonaceous materials and gases generated therefrom, for increasing the illuminating power and purifying coal gas, and in using and applying the products derived therefrom to various useful purposes." Aug. 24, 1878.

3386.—Papineau, R. W., Battersea Park Road, London, "Improvements in the mode of employing bisulphide of carbon and other volatile solvents, and in the means adopted for recovering various substances of commercial value from their solutions." Aug. 27, 1878.

3397.—Kenyon, H., Warrington, Lancs, "Improvements in purifying coal gas, and in the manufacture of carbonate of ammonia, ammoniacal salts, and carbonate of soda." Aug. 28, 1878.

3422.—Tasker, J. W., Halifax, "Improvements in illuminating apparatus applicable to street-lamps and other gas-burners." A communication. Aug. 29, 1878.

Share List of Gas and Water Companies.

(Corrected by Mr. F. N. Golding, Sun Court, Cornhill, from the latest Stock Exchange Quotations.)

Number of Shares issued.	Amount per Share.	Name.	Amount paid up per Share.	Last Divd. p.Cent. p. Ann.	Latest Quotations.
	£	Gas Companies.	£ s. d	£ s. d	£
589892	10	Alliance and Dublin	10 0 0	10 0 0	17½—18½
10000	20	Anglo-Romano . .	20 0 0	10 0 0	20—24
5000	20	Bahia (Limited). .	20 0 0	3 0 0	11—13
1000	20	Do., do., redeem.	20 0 0	10 0 0	25—27
1560	20	Do., 2nd pref. . .	20 0 0	7 10 0	..
40000	5	Bombay (Limited).	5 0 0	7 10 0	6¼—6⅞
10000	5	Do., fourth issue.	4 0 0	7 0 0	4½—5
5000	20	Bournemouth . . .	10 0 0	3 0 0	13—15
229700	..	Brentford	100 0 0	9 0 0	160—165
..	..	Do., 5 per ct. pref.	100 0 0	5 0 0	103—108
..	20	Do., C shares . .	10 0 0	9 0 0	7⅞-8¼ pm
5400	20	Brighton	20 0 0	9 0 0	34—36
5000	20	Brighton and Hove	20 0 0	10 0 0	34—36
13000	20	British (Limited) .	20 0 0	10 0 0	36—38
7223	20	Cagliari (Limited).	20 0 0	6 0 0	16—18
..	10	Colney Hatch . . .	10 0 0	4 0 0	9—10
5500001.	Sk.	Commercial	100 0 0	10 0 0	180—185
70000	100	Do., 7 per cent. .	100 0 0	7 0 0	130—133
20000	20	Continental Union.	20 0 0	6 0 0	18½—19⅛
20000	20	Do., new	12 10 0	6 0 0	1¼-⅛ dis.
10000	20	Do., preference .	20 0 0	7 0 0	22—24
75000	Sk.	Crystal Palace Dist.	100 0 0	10 0 0	175—185
125000	Sk.	Do., 7 per cent. .	100 0 0	7 0 0	130—140
50000	Sk.	Do., preference .	100 0 0	6 0 0	120—130
7100	25	Edinburgh	25 0 0	10 0 0	52—53
23406	10	European (Limited)	10 0 0	10 0 0	17 —18
12000	10	Do., new shares .	7 10 0	10 0 0	5¾-6¼pm.
35406	10	Do., new shares .	5 0 0	10 0 0	3¾-4¼pm.
40948401	Sk.	Gaslight & Coke A.	100 0 0	10 0 0	173—178
1000001.	Sk.	Do. B.	100 0 0	4 0 0	78—82
50000	10	Do. 5 per ct. pref. conv., 4th issue.	10 0 0	5 0 0	15—16
50000	10	Do. do., 5th do. .	6 0 0	5 0 0	4¼—5¼
2000001.	Sk.	Do. C 10 p.c. pref.	100 0 0	10 0 0	198—203
3000001.	,,	Do. D do. do. .	100 0 0	10 0 0	198—203
1650001.	,,	Do. E do. do. .	100 0 0	10 0 0	198—203
30000l.	,,	Do. F 5 do. do. .	100 0 0	5 0 0	101—104
60000l.	,,	Do. G 7½ do. do. .	100 0 0	7 10 0	143—148
13000000l	,,	Do. H	100 0 0	7 0 0	130—135
6200	5	Georgetown, Guiana	5 0 0	5 0 0	..
300000	100	Glasgow Corporation Gas	100 0 0	6 15 0	160—163
115000	100	Do., do.	100 0 0	..	203—205
..	10	Grimsby Gas, A . .	100 0 0	..	203—205
7000	10	Hampton Court . .	10 0 0	10 0 0	16—17
..	..	Hong Kong (Lim.)	10 0 0	10 0 0	17—19
..	..	Hornsey	..	..	..
2000000	50	Imperl. Continental Gas Association	100 0 0	5l.p.sh.	177—182
..	..	Kingston	..	..	..
..	..	Lea Bridge	..	..	..
9000	4	Limerick Gas . . .	4 0 0	2 10 0	2⅞—3¼
561001.	100	Liverpool United .	100 0 0	10 0 0	199—201
1691001.	100	Do., B	100 0 0	7 0 0	145—147
3849001.	Sk.	London	100 0 0	10 0 0	180—185
1622501.	Sk.	Do., 1st pref. . .	100 0 0	6 0 0	115—125
14450	Sk.	Do., 2nd pref. . .	100 0 0	6 0 0	..
4350	Sk.	Do., 3rd pref. . .	100 0 0	6 0 0	..
7622	25	Do., A shares . .	..	6 0 0	..
266921.	All	Do., Debent. stk.	100 0 0	5l.& 6l.	..
15000	5	Malta and Mediterranean (Limited).	5 0 0	2 10 0	2¼—2¾
6000	5	Do., preference .	5 0 0	7 10 0	6—7
20000	5	Mauritius (Limited)	2 5 0	2 10 0	½—1
25000	20	Monte Video (Lim.	20 0 0	8 0 0	16—17
8000	10	Nictheroy, Brazil (Limited) . . .	10 0 0	5 0 0	..
30000	5	Oriental (Calcutta).	5 0 0	9 10 0	7—7½
30000	5	Do., new shares .	3 0 0	9 10 0	1¼-1½pm
10000	5	Ottoman (Limited).	5 0 0	3 0 0	2¼—2⅝
10000	10	Para (Limited) . .	10 0 0	3 0 0	4¼—5¼
27000	20	Phœnix	20 0 0	10 0 0	36—38
3600001.	100	Do., new max. 7½	80 0 0	7 10 0	111—114
1440001.	Sk.	Do., capitalized .	100 0 0	5 0 0	100—103
..	20	Do., new, 1876. .	6 0 0	10 0 0	14-15pm
..	..	Richmond (Surrey)	..	..	..
37500	20	Rio de Janeiro (L.)	20 0 0	10 0 0	25—26
1500	32½	Shanghai	32 10 0	12 0 0	30—32
..	100	Sheffield, A, B, & C.	100 0 0	10 0 0	208—210
6200	5	Singapore (Limited)	5 0 0	7 10 0	5½—5⅝
2000	5	Do., preference .	5 0 0	7 10 0	5½—6¼
4000	50	South Metropolitan	50 0 0	11 0 0	100—105
4000	12½	Do.	12 10 0	11 0 0	25—27
20000	12½	Do., new shares .	12 10 0	11 0 0	12½—13⅛ pm.
15000	10	Surrey Consumers.	10 0 0	10 0 0	18 —19
10000	10	Do., new	8 0 0	10 0 0	6-7 pm.
..	5	Tottenham and Edmonton	5 0 0	10 0 0	10¼—11
1500	10	Wandsw. & Putney	10 0 0	10 0 0	17—19
1500	10	Do.	10 0 0	7 10 0	14—15
4000	10	Do.	10 0 0	7 0 0	..
..	..	West Kent	..	..	..
..	..	Woolwich, Plumstd., and Charlton . .	..	..	..
26000	5	West Ham	5 0 0	10 0 0	9—10
		Water Companies.			
615600	100	Chelsea	100 0 0	6 0 0	153—157
1624700	100	East London . . .	100 0 0	6 0 0	155—157
10798	50	Grand Junction . .	50 0 0	5 0 0	86—89
5840	25	Do., ¼ shares . .	25 0 0	5 0 0	43—45
6160	25	Do., new ditto; max. div., 7½ p.c.	25 0 0	5 0 0	38—40
5551801.	100	Kent	100 0 0	8 0 0	208—212
7818001.	100	Lambeth	100 0 0	6 5 0	153—157
3261501.	100	Do., max., 7½ p.c.	100 0 0	6 5 0	149—152
442	100	New River	100 0 0	7 0 0	320—350
4475	100	Do.	85 0 0	7 0 0	280—300
400000	100	Do., deb. sk., 4 p.c.	100 0 0	4 0 0	101—103
3247001.	100	Do., pref. stock .	100 0 0	5 0 0	115—117
1265001.	100	Do., D shares . .	100 0 0	4 0 0	107—109
700001.	100	Do., new ordinary	..	4 10 0	..
1600	100	Do., new ord. No. 1	40 0 0	4 10 0	..
15073	61	West Middlesex . .	61 0 0	6l.p.sh.	141—144

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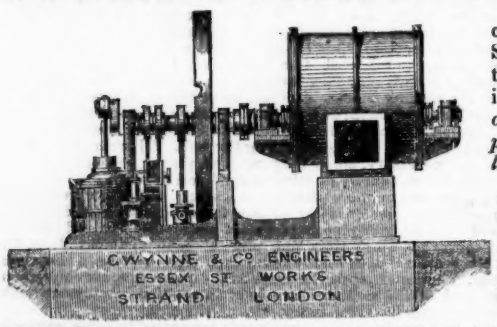

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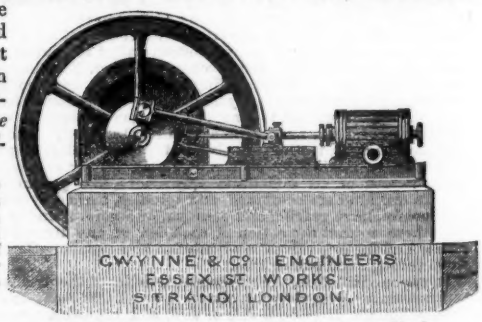

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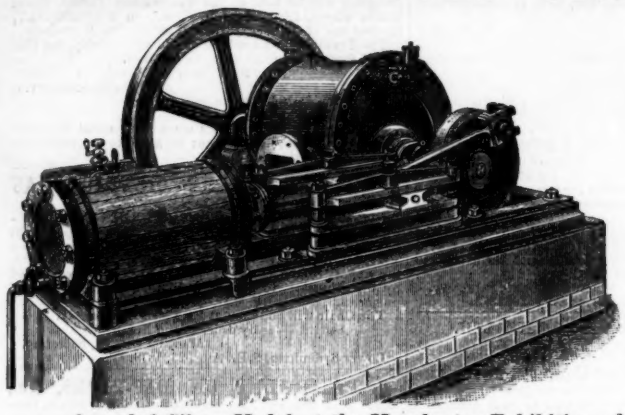

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A Share in a Patent Apparatus con- nected with Gas-Works for SALE; also the Right to Manufacture the same.
Address 11, City Buildings, Corporation Street, MANCHESTER.

SMALL Gasholder with Tank for Sale, 6 ft. by 5 ft. Substantially made of best wrought iron, Pillars, Chains, &c., complete; the whole in first-class order.
Apply to Mr. WOOD, Burgh Gas Analyst, DUMFRIES.

ON SALE—A Station-Meter (with new Drum), capable of passing 10,000 cubic feet per hour, with Hydraulic Valves, Bye-Pass, &c.; 10-in. Connections. Has been removed to make room for one of larger capacity.
For particulars and price, apply to GEORGE NEWTON, Gas-Meter Manufacturer, Union Street West, OLDHAM.

FOR SALE — One 50 ft. by 14 ft. Gas- HOLDER, nearly new, with Columns and Girders. Price £225, a bargain.
Also a STATION-METER, in good working order, to pass 15 000 feet per hour; and Four 10 ft. PURIFIERS with Hydraulic Centre-Valve.
Apply to J. S. REEVES, Manager, Gas-Works, BILSTON.

MATLOCK.

TO BE SOLD—The Matlock Bridge, Bank Town, Darley, and Rowsley Gas-Works, in a thriving neighbourhood. The owner is 72 years of age, and giving up. Gas, 5s.; 3d. off in 14 days. Coke, 8s. 4d.; Tar, 34s.; Liquor, 9s. 6d.; Coals, 9s. 1d.; Nuts, 7s. 2d. Lime cheap.
Apply to JOSH. WINSOR, Stanedge House, BAKEWELL.

STATION-METER FOR SALE.

THE Gas Committee of the Rochdale Corporation offer for SALE a STATION-METER, capacity 25,000 cubic feet per hour, 12-in. Connections, Hydraulic Valves, and Bye-Pass, and all other necessary fittings. The Meter to be removed in consequence of extensions.
Any further information thereon can be had from the Manager at the Works.
Tenders, endorsed "Tender for Station-Meter," must be sent to me on or before the 13th inst.
By order,
ZACH. MELLOR, Town Clerk.
Town Hall, Rochdale, Aug. 2, 1878.

TO GAS APPARATUS MANUFACTURERS.

THE Buxton Local Board invite tenders for the Supply and Fixing of four PURIFIERS, 14 ft. square, and a CENTRE-VALVE with 12 in. connections.
The plan may be seen, and specification and form of tender obtained, on application to Mr. G. SMEDLEY, Gas Office, Buxton.
Tenders, endorsed "Purifiers," addressed to the Chairman of the Gas Committee, to be forwarded not later than the 5th of September next.
The Board do not bind themselves to accept the lowest or any tender.
Buxton, Aug. 22, 1878.

RUSHDEN GAS-WORKS.

THE Directors of the Rushden Gas Com- pany are desirous of receiving TENDERS for the Erection of a new GASHOLDER, 36 ft. in diameter and 15 ft. in height.
Plans and specifications can be seen at the Works after the 28th inst.
Tenders are to be sent in to the Secretary not later than the 9th day of September next.
By order of the Directors,
W. FOSKETT.

TENDERS FOR TAR.

THE Directors of the Exeter Gaslight and Coke Company invite TENDERS for their surplus TAR for One year from the 1st of October next. Probable quantity from 110,000 to 130,000 gallons. Delivery on Company's Works, filled into purchaser's vessels. Payments, cash monthly.
Tenders, endorsed "Tenders for Tar," will be received by the undersigned on or before Monday, the 16th of September next, but the Directors do not bind themselves to accept the highest or any tender.
W. A. PADFIELD, Secretary.
Gas Offices, North Street, Exeter, Aug. 22, 1878.

BANGOR LOCAL BOARD OF HEALTH.

TENDERS FOR GAS COAL.

THE Water and Gas Committee for the above Board invite TENDERS for 2500 Tons of Best Screened GAS COAL, to be delivered in such quantities and at such periods as may be required during the 21 months ending June 30, 1880.
Parties tendering must give full particulars of the Coal offered, and the colliery from which they propose the supply to be delivered (carriage paid) at the London and North-Western Railway Station, Bangor, Carnarvonshire.
Sealed tenders, addressed to the undersigned, will be received until the 12th of September next.
DAVID WHITE, Secretary and Manager.
Water and Gas Works, Bangor, Aug. 24, 1878.

CAMBRIDGE UNIVERSITY AND TOWN GASLIGHT COMPANY.

TO TAR DISTILLERS.

THE Directors of this Company will, at their meeting on the 26th inst., be prepared to receive TENDERS for the Surplus TAR produced at these Works for a period of Two years.
Probable make about 120,000 Gallons per year.
Sealed tenders, addressed to the Chairman, to be delivered not later than the 25th inst.
Further particulars may be had from
JAMES WEEKS, Manager.
Gas Office, Cambridge, Sept. 2, 1878.

BOROUGH OF DUMFRIES.

TENDERS are wanted by this Gas Cor- poration for the Supply, at Dumfries Station, carriage paid, of—

	cwt.	qr.	lb.
(1.) MAIN-PIPES—			
550 Yards 6-in. Half Turned and Bored, each length to be 9 ft., and weigh .	2	1	21
560 Yards 4 in., do., do.	1	1	18
473 ,, 3-in., do., do.	3	21	

The Pipes are to be Coated with Composition on the outside only, and proved at 300 ft. water pressure.
(2.) LEAD SERVICE-PIPES—
5 Cwt. 1-in. Lead Pipe, 7 lbs. per yard.
20 ,, ¾-in. ,, 5 lbs. ,,
20 ,, ½-in. ,, 3 lbs. ,,
(3.) 2 Doz. 1-in. Brass Couplings, Screw Tailed.
2 Grs. ¾-in. ,, ,,
2 ,, ½-in. ,, ,,
1 ,, ¾-in. Plain Couplings.
1 ,, ½-in. ,,
½ ,, ¼-in. ,,
Tenders to be lodged with WILLIAM MARTIN, Clerk to Gas Commissioners, DUMFRIES, on or before the 9th of September next.
The lowest or any offer may not be accepted.
Town Hall, Dumfries, Aug. 31, 1878.

CITY OF HEREFORD.

TO GASHOLDER MAKERS, IRON PIPE FOUNDERS, AND OTHERS.
CONTRACT No. 2.

THE Gas Management Committee of the Corporation of Hereford hereby invite TENDERS for the Supply, Erection, and Completion of a TELESCOPIC GASHOLDER, 82 ft. diameter and 30 ft. deep.
Copies of specification may be obtained (on payment of one guinea, which will be returned upon receipt of a *bonâ fide* tender) on application to the undersigned. The drawings will be open for inspection between the hours of Nine a.m. and Five p.m. any work day, at the Gas-Works Office.

CONTRACT No. 3.

For the supply of about
2000 lineal Yards of 16-in. Turned and Bored PIPES.
500 ,, 14-in. ,, ,, ,,
200 ,, 12-in. ,, ,, ,,
Together with a quantity of Special Castings.
Copies of specification may be obtained on same conditions as above.
Sealed tenders, properly endorsed, addressed to the undersigned, to be sent in on or before Monday, Sept. 23 next.
The Committee do not bind themselves to accept the lowest or any tender.
By order of the Committee,
WILLIAM DAVIS, Engineer.
Gas Office, Hereford, Aug. 20, 1878.

HENRY LYON (14 years Engineer and Manager of the largest of the Manchester Corporation Gas-Works) Mechanical and Consulting Gas Engineer, reports upon the condition and value of Gas-Works, supplies plans and specifications of all Apparatus appertaining to Gas-Works, and re-models existing Works.
Address Brooklyn, near Halliwell Lane, Cheetham Hill Road, MANCHESTER.

SULPHATE OF AMMONIA PLANT.

THE Newest, Best, and Cheapest Plant for Making SULPHATE of AMMONIA. Plans may be obtained for the erection of this economical and efficient apparatus, or tracings of plans with specifications. Terms moderate.
Address JOHN G. HARVEY, Little Island, CORK.

THE LONDON GASLIGHT COMPANY.

NOTICE is hereby given that the ORDINARY HALF-YEARLY MEETING of PROPRIETORS of the Company will be held at the Freemasons Tavern, Great Queen Street, Lincoln's Inn Fields, on WEDNESDAY, the 2nd day of October, 1878, at Twelve o'clock precisely.
The Transfer Books will be closed on Tuesday, the 17th day of September, until after the meeting.
By order of the Board,
A. J. DOVE, Secretary.
Dated this 28th day of August, 1878.

MEMORANDUM.—Proprietors must hold capital stocks or shares paid up to the amount of £250, to be qualified to attend this meeting.

CRYSTAL PALACE DISTRICT GAS COMPANY.

NOTICE is hereby given that the ORDINARY HALF-YEARLY GENERAL MEETING of this Company will be held at the Albion Tavern, Aldersgate Street, on THURSDAY, the 19th day of September, 1878, to receive the Report of the Directors, the Balance-Sheet confirmed by the Auditors, to declare a Dividend, and for general purposes.
The Chair will be taken at Two o'clock precisely.
By order of the Board,
MAGNUS OHREN, Secretary.
Lower Sydenham, S.E., Aug. 23, 1878.

A PAMPHLET ON DIP-PIPES, &c., post free 6½d., on application to W. WHITE, Gas-Works, Abersychan, MON. See Reviews in the *Gas Trade Circular and Review*, March 29, 1878, and *Design and Work*, March 30, 1878.

NOTICE TO MANAGERS OF GAS COMPANIES.

THE LAW UNION FIRE AND LIFE INSURANCE COMPANY, of No. 126, Chancery Lane, London, grants Policies of Insurance on Gas-Works, and Buildings connected therewith, which cover risk of explosion and spontaneous ignition of Coal, on very advantageous terms. Full particulars will be sent post free on application to
FRANK M'GEDY, Secretary.
126, Chancery Lane, London.

T. NEWBIGGING,
CONSULTING GAS ENGINEER,
5, NORFOLK STREET, MANCHESTER.

MR. EDWARD SANDELL,
Associate of the Society of Accountants in England,
Publisher of the
"Gas Companies Expenditure Journal,"
Begs to announce his REMOVAL from Skinner's Place, Sise Lane, to
No. 2, ST. GEORGE STREET, WESTMINSTER.

Mr. ROBERT DEMPSTER, Sen.,
CONSULTING GAS ENGINEER,
Of Messrs. Robert Dempster and Sons, Rose Mount Gas Engineering Works,
ELLAND, near HALIFAX,
May be consulted on all matters connected with Valuations, Arbitrations, and Parliamentary Applications connected with Gas-Works. Our R. D., Sen., having been engaged on extensive Arbitration Cases, which, combined with his experience in Construction and Contracting, his knowledge of Engineering and Valuations, is both extensive and reliable.

ALFRED LASS,
SPECIAL ACCOUNTANT FOR GAS COMPANIES,
30, GRACECHURCH STREET, LONDON.
Accounts analyzed and Statistics Prepared for Parliamentary Proceedings, Arbitrations, &c.
The Forms of Account, which have been specially designed to meet the requirements of the Gas-Works Clauses Amendment Act, 1871, are now in use by many Gas Companies, and have been universally approved.
The above forms are registered.
Water Companies Accounts also prepared and adjusted.
CONSULTATIONS.

W. LIDDALL,
Public Accountant,
15, UNION COURT,
OLD BROAD STREET, E.C.

BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.
Manufactory for every description of Castings and Machinery for Gas-Works and Water-Works.
Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.
Agent in London, Mr. J. MANWARING, 101 Cannon Street, E.C.

BOUCK & CO., LIMITED,
TAR DISTILLERS & MANUFACTURING CHEMISTS,
MILES PLATTING, MANCHESTER.
BRANCH WORKS, BLACKBURN.
BUYERS OF COAL TAR,
And Crude Products therefrom,
AMMONIACAL LIQUOR, &c.

TO ENGINEERS & MANAGERS.—CLIFTON'S
PATENT COKE AND COAL BARROW
Is acknowledged to be the best Barrow in the Market.
For particulars, with Drawings and Prices, apply to the Sole Makers,
THORNELOE & COMPANY,
ENGINEERS AND CONTRACTORS,
57, BARBICAN, LONDON, E.C.

JOHN HALL AND CO., STOURBRIDGE,

Manufacturers of FIRE-BRICKS, LUMPS, TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

BEST GAS COALS

DIRECT FROM THE

MARQUESS OF LONDONDERRY'S COLLIERIES,

COUNTY OF DURHAM.

For Prices and Particulars, apply to

MR. S. J. DITCHFIELD,

LONDONDERRY OFFICES, SEAHAM HARBOUR, COUNTY OF DURHAM.

GAS-FITTERS TOOLS.

CRAMPTON BROTHERS

MANUFACTURES AND SPECIALITIES,

SHEFFIELD.

Screw Stocks, Taps and Dies, Tube Wrenches,
Tube Cutters, Tube Vices, Tongs and Pliers, Ratchet Braces,
Staple and Parallel Vices, Vice-Benches, &c.

ESTABLISHED 1866.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,

EDINBURGH, AND

2, KING EDWARD STREET,

NEWGATE STREET, LONDON.

Meter Works in London—2, CROSS STREET, WILDERNESS ROW, E.C.

STATION-METERS, GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,

And every description of Gas-Fittings and Gas Apparatus.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER,

35A, GREAT GEORGE STREET,

WESTMINSTER, S.W.,

PATENTEE and MANUFACTURER of the following Invention

RETORT SETTINGS—giving great Economy of Fuel.

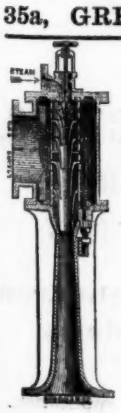
STEAM-ENGINES and EXHAUSTERS, FOUR-WAY VALVES, WASHERS, SCRUBBERS.

FUEL-MACHINE, for Compressing Breeze and Tar.

N.B.—Pamphlet, with Eighteen Illustrations and Letterpress on the Construction of Gas-Works, post free, 2s. 6d.

PRICES AND ALL PARTICULARS TO BE HAD OF THE PATENTEE,

35a, GREAT GEORGE STREET, WESTMINSTER, S.W.



KÖRTING'S STEAM-JET EXHAUSTER.

IMPROVED CLELAND'S PATENT.

UPWARDS OF 300 IN USE.

CLELAND'S SLOW-SPEED CONDENSER & STEAM SCRUBBER.

FOR PARTICULARS, APPLY TO

KÖRTING BROS.,

17, LANCASTER AVENUE, MANCHESTER,

OR TO

GERALD J. TUPP, 8, John Street, Adelphi, W.C., LONDON,

SOLE AGENT FOR ENGLAND AND WALES.

THOMAS CARR & SON,

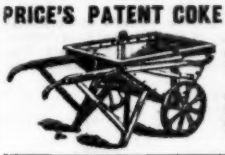
MANUFACTURERS OF

FIRE-BRICKS, LUMPS, TILES, RETORTS, &c.,

SCOTSWOOD FIRE-BRICK WORKS, SCOTSWOOD-ON-TYNE.

Also Makers of all kinds of Common Building Bricks, and of Pressed White and Red Bricks for Facing.

PRICE'S PATENT COKE & COAL BARROW



effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

HOPKINS, GILKES, & CO.,

LIMITED,

MIDDLESBOROUGH,

SUPPLY GAS & WATER PIPES of EVERY SIZE.

Plain, Turned and Bored, and Coated.

CAST-IRON RETORTS.

Castings for Gas-Works of every description.

EXHAUSTERS.

LONDON OFFICE: 25, LAURENCE POUNTNEY LANE.

BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications addressed to J. SUGG & Co., GHENT, will receive immediate attention.

JAMES NEWTON & SONS,

(Established 1820,)

FIRE-BRICK AND TILE MERCHANTS,

Wholesale and for Exportation,

FALCON DOCK, 78 AND 79, BANKSIDE,

SOUTHWARK, LONDON, S.E.,

DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for

GAS AND WATER WORKS.

CLOTH GAS-BAGS FOR MAINS.

As supplied to the Imperial, Chartered, and other London and Provincial Gas Companies. Bellows and Valves for inflating Well Dresses, Stokers Gloves, India-Rubber Suction and Delivery Hose, Gas-Tubing, Leather, India-Rubber, and Gutta-Percha Machine-Bands, Sheet and Washers, and Steam Joints.

T. BUGDEN, Manufacturer,

107, GOSWELL ROAD, LONDON, E.C.

HEBBURN MAIN GAS COALS.

T. Stone, Esq., of Weymouth, writes on Nov. 17, 1876: "I have used about 12,000 tons of this Coal, with, I think, the best possible results, although not always under the most favourable circumstances. My Coal account made up to Midsummer last showed a makeage of 10,524 cubic feet per ton of 14½-candle gas, and not a hundredweight of Cannel used. This statement would, I know, be incredible to many men, and may provoke the remark, 'How much of it is paid for?' For the gratification of such, I have to say that, of the above quantity, 9866 cubic feet per ton of Coal carbonized were brought to charge and duly paid for, with the exception of about 6s. per cent. for bad debts. The coke is of excellent quality. The above facts I hold to be a greater recommendation to your Coal than any words of mine could be."

PRICES ON APPLICATION, EITHER F.O.B. OR BY RAIL IN TRUCK LOADS.

THE TYNE COAL COMPANY, LIMITED, OWNERS,
W. RICHARDSON, Fitter,
29, QUAYSIDE, NEWCASTLE-ON-TYNE.

JOHN ROMANS, C.E., F.G.S.E.,

CONSULTING GAS ENGINEER

AND

CANNEL COAL FACTOR,

30, St. Andrew Square, EDINBURGH.

Plans and Estimates furnished; Gas-Works, Apparatus, Pipes, Machinery, Fire Goods, &c., supplied, or Attested and Shipped for Exportation.

GAS-WORKS TAKEN ON LEASE.

Mr. ROMANS has for upwards of 30 years been practically engaged in the Manufacture of Gas, and has, by extensive experiments, ascertained that by JUDICIOUS INTER-MIXTURE of the lighter with the heavier gases, much of the rich Hydrocarbons CAN BE SAVED, which otherwise ARE LOST, during the process of manufacture. He is therefore enabled to give advice to those who favour him with their orders for Cannel, as to the class which will secure for their standard of illuminating power the HIGHEST ADVANTAGEOUS RESULTS.

ANALYSIS AND PRICES FORWARDED ON APPLICATION.

CADZOW COAL COMPANY,
LIMITED.

Cadzow Collieries, Hamilton (Lanarkshire).
Office: 161, Hope Street, Glasgow.

Report on the Cadzow Ell Coal.
By Dr. W. WALLACE, F.R.S.E., F.C.S., Gas Examiner for the City of Glasgow.

I have made a careful chemical analysis and practical assay of an average sample of the Ell Coal from Cadzow Colliery, received on the 5th inst., from Messrs. The Cadzow Coal Company, Hamilton, and have obtained the following results:—

Analysis.

Volatile matters	Gas, tar, &c.	34·03	46·12
	Sulphur	·04	
	Water, at 212° Fahr.	12·05	
Coke	Fixed carbon	52·90	53·88
	Sulphur	·03	
	Ash	·95	
			100·00

Coke (dry) per ton of Coal, 1205 lbs., or 10 cwts. 3 qrs. 1 lb

Analysis of the Coke (Dry).

Carbonaceous or combustible matter	98·18
Sulphur	·06
Ash	1·76
	100·00
Specific gravity of the coal	1·250
Weight of a cubic foot in pounds	77¾

Practical Results.

Gas per ton of coal at 60° F. and 30 in. bar.	10,122 cub. ft.
Illuminating power in standard sperm candles by Argand jet, consuming 5 cubic feet per hour	16·76 candles.
Value of one cubic foot of gas in grains of sperm	402
Equivalent of a ton of coal in pounds of sperm candles	581
Durability of one cubic foot of gas by 5-inch flame	42 min. 45 sec.
Gravity of the gas, air = 1000	448

Remarks.

The sample tested consisted of a complete section of the seam, 5 ft. 6 in. in thickness. The results show that this Coal is well adapted for the manufacture of gas and coke, both being for soft coal of very fine quality. Of the many hundreds of coal samples I have tested, I have not hitherto had one with so small a proportion of ash as the Cadzow Coal. WILLIAM WALLACE.

Chemical and Gas Laboratory,
138, Bath Street, Glasgow, March 15, 1878.

TORBAY AND DART PAINT COMPANY, LIMITED.

WORKS:
DARTMOUTH & BRIXHAM (TORBAY) DEVON.
OFFICES:
3, GREAT GEORGE STREET, WESTMINSTER, LONDON, S.W.

SOLE PROPRIETORS AND MANUFACTURERS OF
WOLSTON'S CELEBRATED
TORBAY IRON PAINTS.

TRADE MARK

These Paints have been for many years extensively used in Her Majesty's Royal Dockyards, Woolwich Arsenal, the Shorncliffe and Curragh Camps, War Departments, and Colonies, and are largely supplied to Railway, Harbour, and GAS COMPANIES, Shipowners, Engineering Establishments, Railway Carriage and Wagon Works, and the Paint Trade generally. They are the BEST PROTECTORS of WOOD, CEMENT, and IRONWORK, even arresting corrosion after it has set in; and their base being oxide of iron, they are free from those properties which make lead paints so destructive to iron. They do not scale or blister, are not affected by great heat, and are the only Paints which will resist the effects of sulphuretted hydrogen. Their DURABILITY and covering properties have borne the test of A QUARTER OF A CENTURY'S PRACTICAL TRIAL.

The undermentioned colours—ground in best linseed oil, and requiring only to be thinned down for use in the ordinary way—are kept in stock:—

Torbay Brown.	Torbay Red.
Dart Green.	Slate.
Dart Yellow.	Buff.
Brixham Black.	Torbay Chocolate.
Light Blue.	Cream Colour.
Dart Brown.	Dart Umber.
Imperial Stone.	Light Stone.
Bronze Green.	Salmon Colour.
Navy Green.	Lead Colour.
Carriage Red.	Dark Stone.
Light Lead.	Crystal Palace Blue.
Light Green.	Iron Grey.

All other Colours made to order.

READY-MIXED PAINTS.

A great variety of Colours ready mixed for the brush are also always kept in Stock, in 3 lb., 7 lb., 14 lb., and 28 lb. cans.

Prices and Testimonials on application.

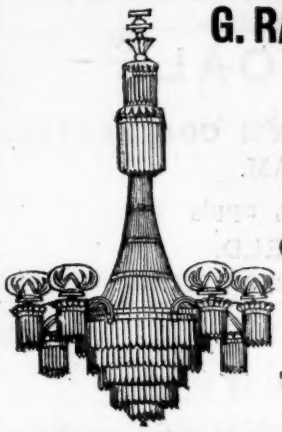
ECONOMY IN THE PRODUCTION OF GAS.

PLUTONIC CEMENT,

For Jointing and Repairing Retorts and Ovens *in* action and *out* of action.

A Pamphlet on the advantages of the above, with modes of Application, References, Prices, &c., free by post, from the Sole Manufacturer,

WILLIAM RICHARDSON, GAS AND HYDRAULIC ENGINEER,
CHARLES HENRY STREET AND BISSELL STREET, BIRMINGHAM.



G. RAINSFORD & SON,

ESTABLISHED 1850,

MANUFACTURERS OF

CHANDELIERS

AND

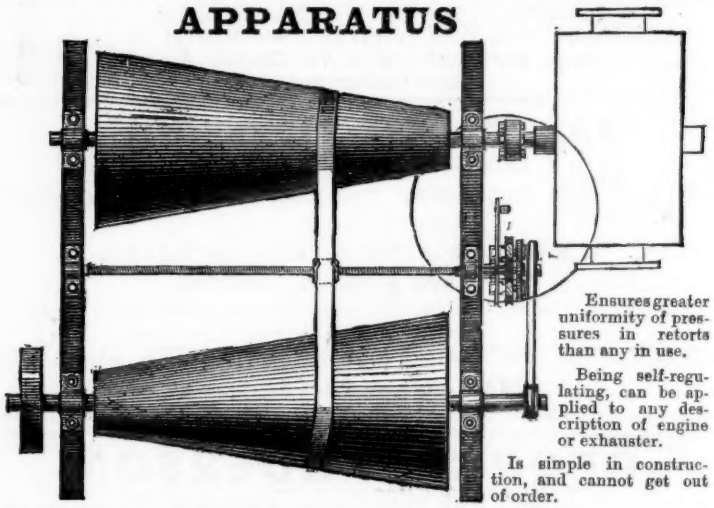
GAS-FITTINGS,

SUITABLE FOR

GAS COMPANIES.

70, BROAD STREET,
BIRMINGHAM.

FISON'S PATENT SELF-REGULATING GAS-EXHAUSTING
APPARATUS



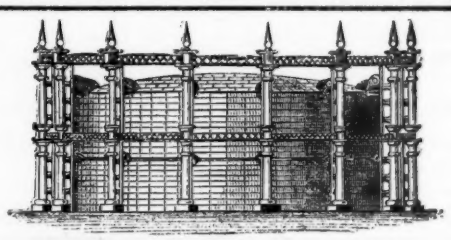
Ensures greater uniformity of pressures in retorts than any in use.

Being self-regulating, can be applied to any description of engine or exhauster.

Is simple in construction, and cannot get out of order.

JASPER & WM. SNOWDON, Manufacturers,
OLD BANK CHAMBERS, PARK ROW, LEEDS.
Full Particulars, Testimonials, Descriptive Circulars, Estimates, &c., on application.

HOPE IRON WORKS,



STOCKTON ON TEES.

ASHMORE & WHILE,
GAS ENGINEERS & CONTRACTORS,
MANUFACTURERS OF GASHOLDERS,

GAS APPARATUS OF EVERY DESCRIPTION,
Including Improved
Retort-Lids, Boilers, Cast and Wrought Iron Tanks, Iron Roofing, Bridges, Girders,
And GENERAL IRONWORK.

N.B.—Estimates for all Gas Plant and Remodelling supplied on application.

F. & C. OSLER,

45, OXFORD STREET, LONDON, W.

MANUFACTORY AND SHOW-ROOMS:

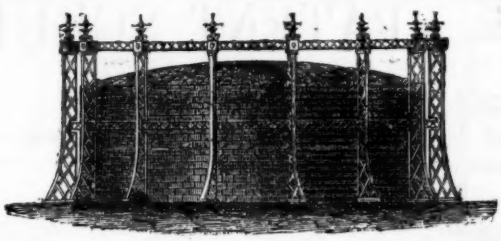
BROAD STREET, BIRMINGHAM.

ESTABLISHED 1807.

MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS, WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.



THE HORSELEY COMPANY,

LIMITED,

TIPTON, STAFFORDSHIRE.

LONDON OFFICE:

6, WESTMINSTER CHAMBERS, VICTORIA STREET,

GAS ENGINEERS, IRONFOUNDERS, &c.,

MANUFACTURERS OF

GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED LAMP-POSTS, PIPES,

AND ALL REQUISITES FOR EITHER

GAS OR WATER WORKS;

ALSO

MAKERS OF ROOFS, BRIDGES, &c.

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HYDRAULIC ENGINEERS,

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PUMPING MACHINERY of every Description.

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BLAKE'S PATENT STEAM-PUMPS,

More than 10,000 in use,

ESPECIALLY ADAPTED FOR USE IN GAS AND CHEMICAL WORKS, FOR PUMPING TAR, WATER, AMMONIACAL LIQUOR, ACIDS, &c.

The following are some of the prominent advantages of the BLAKE PUMP:—

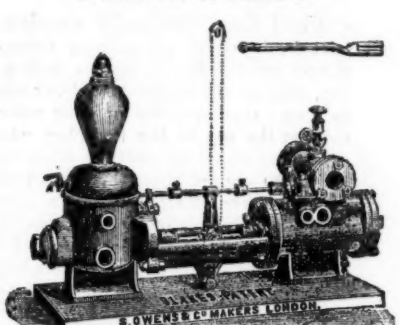
It will start at any point of stroke.

It has no dead point.

It works fast or slow, with the same certainty of action.

It is economical. Has a lead on the slide-valve.

It is compact and durable.



It is interchangeable in all its working parts.

It will deliver more water than any other pump.

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Keep in London and at their works large stocks of PIPES and CONNEXIONS (1½ to 36 inches in diameter); also make and supply Retorts, Tanks, Columns, Girders, Special Castings required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

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SILICA FIRE-BRICK CO.,

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Of all Dimensions for Gas-Works,

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Of every kind.

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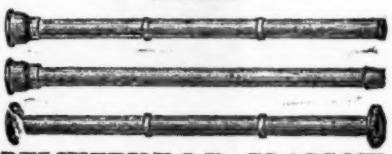

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The STRONGEST, CHEAPEST, & BEST in the TRADE.

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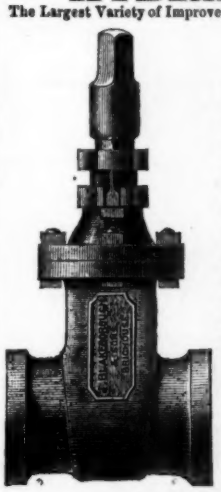

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Tested with 600 to 1000 feet head of pressure.

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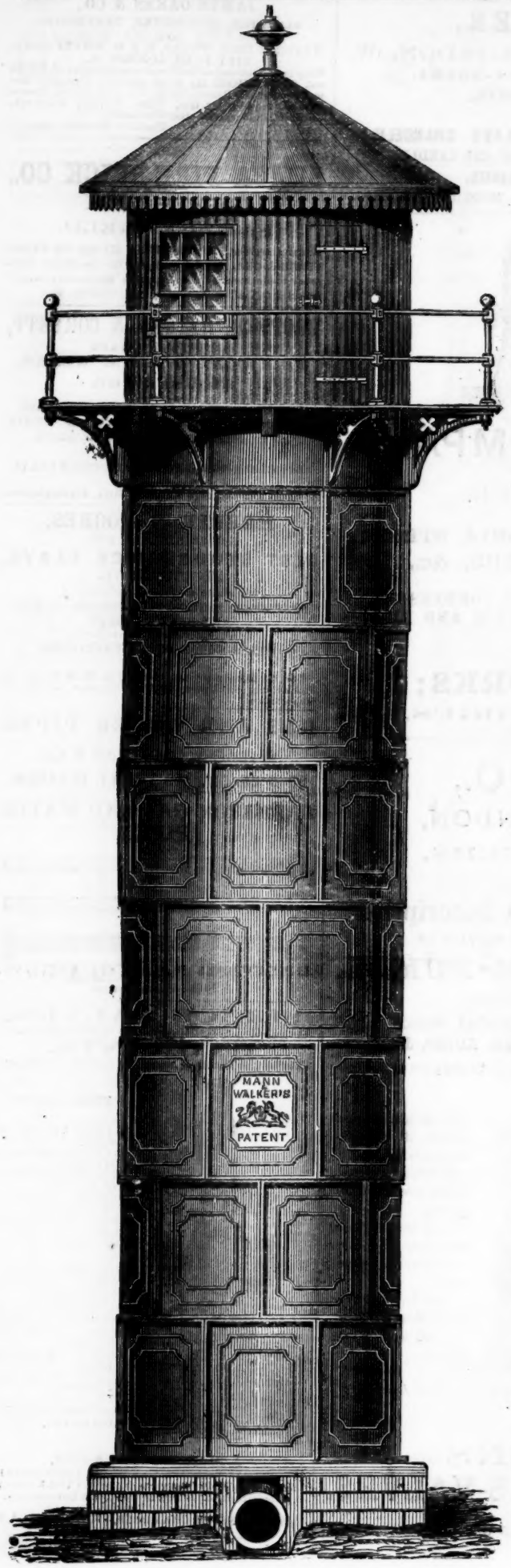
Where Samples may be seen.



C. & W. WALKER,
8, FINSBURY CIRCUS,
LONDON, E.C.

MANN & WALKERS' PATENT SCRUBBER.

By Letters Patent in Great Britain, Europe, and the United States of America.

By some important improvements recently patented, the purifying power of these Scrubbers has been much increased, and a stronger ammoniacal solution obtained, which is found to absorb a large portion of the carbonic acid contained in gas, effecting an important saving in money and labour in the lime purifiers, and where oxide only is used, the increase in the illuminating power of the gas obtained by these Scrubbers is shown in a remarkable degree, in consequence of the large quantity of carbonic acid removed from the gas.

It is to be particularly noted that the im- portant results of these Scrubbers do not depend upon the machinery alone. The entire internal construction of the Scrubber bears an almost equally important part. For this reason, where it is desirable to convert existing Scrubbers, whose dimensions happen to be suitable, the work commences by ripping out the whole of the interior of the shell, and beginning the internal construction *de novo* from bottom to top.

Fifty million cubic feet of gas per 24 hours are purified from ammonia by these Patent Scrubbers in a winter's day in the gas-works of London, where the purity of gas supply is the highest in the world, under the chemical restrictions of the Board of Trade.

Generally, wherever a high standard of purification is maintained in the chief cities and towns of the British Provinces and of Europe, these Scrubbers have become established.

By their use the department of purification from ammonia upon a gas-works is made complete, without the aid of prepared oxide of iron, chemicals in purifiers, or any other supplementary process, and the whole ammoniacal residual product contained in the coal is absorbed and obtained in the form most profitable to a gas company, while the requirements of all Acts of Parliament and of the Board of Trade, relating to incorporate gas companies, are satisfied.

Foul Gas, properly condensed, entering the inlet is, by once only passing through the Scrubber, completely purified from ammonia with regular certainty day by day, without any further trouble, or any other process, effected by a very small quantity of clear water let into the machinery room at the top of the Scrubber, which is discharged at the liquor outlet at the bottom, from Newcastle coal at about 18 to 20 ounces strength, from Yorkshire and other coals, generally from 25 to 30 ounces strength; while acidulated litmus or turmeric exposed at the Scrubber outlet will not show the slightest discoloration, and there is not a quarter of a grain of ammonia per 100 feet left unabsorbed.

They contain their own engine power, requiring only a small inappreciable quantity of steam from the gas-works boiler, and are then complete in themselves, ready for service.

Applications relating to dimensions and prices should be addressed to us, C. AND W. WALKER, 8, FINSBURY CIRCUS, LONDON, E.C., or to Mr. WILLIAM MANN, late Superintendent of the Chartered Gas-Works, BLACKFRIARS, LONDON; they should state approximately the largest make of gas in 24 hours on a winter's day, and the smallest make on a summer's day, to be purified.

THE AMERICAN GAS-LIGHT JOURNAL.

A. M. CALLENDER & CO., Proprietors. G. WARREN DRESSER, Editor.

Issued Semi-Monthly at No. 42 Pine Street, New York City.

This Journal is especially devoted to Gas Engineering and Manufacture, and is the official organ of the AMERICAN GAS-LIGHT ASSOCIATION, and the NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

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(LATE JOHN VICKARY, ESTABLISHED 1830)

GAS ENGINEERS AND CONTRACTORS, WEST OF ENGLAND GAS ENGINEERING WORKS, EXETER,

WET AND DRY GAS-METER MANUFACTORY,

Invite the attention of Gas Companies and others for the supply of

EVERY DESCRIPTION OF GAS APPARATUS.

SAMUEL CUTLER & SONS,

CONTRACTORS FOR GAS & WATER WORKS, GENERAL ENGINEERS, IRONFOUNDERS & MANUFACTURERS OF

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SCRUBBERS, VALVES, EXHAUSTERS, IRON ROOFS, BRIDGES, BOILERS, AND GENERAL CAST AND WROUGHT IRON WORKS.

S. C. & SONS undertake the entire erection of New, or Remodelling of existing Gas-Works in any part of the World, including small Works for MANSIONS, FACTORIES, &c., or Works of the largest extent (are now constructing the largest Gasholder yet erected); also the supplying and laying of MAINS.

They make a speciality of supplying every requisite whatever for Gas-Works, keeping in Stock what are most in request. WOOD SIEVES for Purifiers and Scrubbers, of a superior make.

SPECIAL CASTINGS to Drawing or Pattern at Shortest Notice.

Manufacturers of MORRIS & CUTLER'S PATENT CONDENSER & CUTLER'S PATENT GAS-WASHER.

DESCRIPTION OF MORRIS & CUTLER'S PATENT CONDENSER.—The Condenser may consist of pipes arranged in tiers, or in any other form most convenient to the site available, each tier being connected with special connections, and containing within same either one or more coils of smaller pipe through which water is passed, being supplied from any convenient source of supply, the water passing in an opposite direction to the gas, so that the coldest water is at the gas outlet. The power of the Condenser can be regulated precisely in proportion to the quantity of water allowed to pass through, which is not in any way contaminated, but simply heated by the hot gas, and advantage can be taken of its being at a high level to carry it to a high-level cistern, from whence it can be used for supply to boiler or any other purpose. The Condenser itself may form the support for a high-level cistern. By an arrangement of valves the water may be shut off, and an air orifice opened, when air will pass through instead of water, or both air and water can be shut off. The power of the Condenser is, therefore, entirely under control. The Condenser may be seen in operation at the Brentford Gas-Works.

For further Particulars, apply to Mr. F. MORRIS, GAS-WORKS, BRENTFORD, or to S. CUTLER & SONS, PROVIDENCE WORKS, MILLWALL (Near the Steamboat Pier), LONDON, E.

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IN BEST QUALITY TIN-PLATE AND FINE IRON CASES,

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MANUFACTURED SOLELY BY

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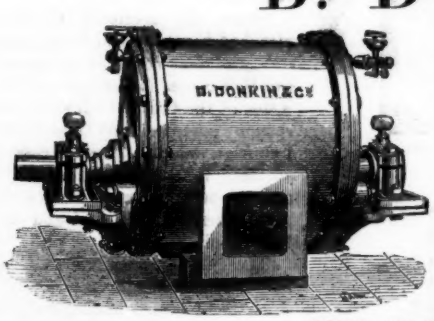

These Exhausters have but one solid slide, which ensures less wear and friction, and thus fewer repairs are necessary. They are made with two outside bearings and with all latest improvements.

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STEAM-ENGINES FOR DRIVING GAS EXHAUSTERS.
IMPROVED GAS-VALVES.
VALVES FOR AMMONIACAL LIQUOR, TAR, and HYDRAULIC MAINS,
VALVES FOR SPECIAL PURPOSES, WITH COLUMNS,
SCALES, AND GAUGES.
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Yields 12,500 cubic feet of 34-candle gas per ton, and 9 cwts. of excellent coke, containing only 4 per cent. of ash.

MUIRKIRK, No. 1, CANNEL

Yields 12,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash.

OLD WEMYSS CANNEL

Yields 13,320 cubic feet of 32·5-candle gas per ton.

Prices and full Analyses on application.

GAS COAL.

POPE & PEARSON, LIMITED, have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to POPE AND PEARSON, LIMITED, West Riding and Silkstone Collieries, near LEEDS.

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The Subscriber is prepared to contract for the supply of all the principal SCOTCH CANNEL COALS. Prices and Analyses of the various Coals will be forwarded on application.

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Established 1840.

DEAN'S PRIMROSE GAS COALS.

South Metropolitan Gaslight and Coke Company, London, July 12, 1878.

The Owners of the Dean's Primrose Colliery.

Dear Sirs,—I have much pleasure in stating that this Company have regularly used your Coals for more than thirty years, and that in all essential particulars they give the most satisfactory results.

The yield of Gas is from 9700 to 9800 feet per ton, of full 16 candles illuminating power, tested by the London Referees Standard Burner; and the Coke is of very good quality, while the quantity is about 40 bushels to the ton of Coal.

I consider Dean's Primrose Coals to rank amongst the first-class Gas Coals from the Durham Coal-Field.

Yours truly, GEORGE LIVESEY.

These Coals are also used by The Gaslight and Coke Company (London), and other English and Foreign Gas Companies.

Steamers loaded with quick despatch in the River Tyne. Price and other terms on application at the

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At the request of Mr. Hedley, the owner of the Holmside Colliery, I have much pleasure in stating that, for about ten or twelve years past, this Company has taken at least half of its supply of Newcastle Coal from him. I can, therefore, confidently bear testimony to the good quality of the Holmside Coals, and consider they are equal to the best of the Newcastle Coals, in proof of which I may state that this year we are using those Coals exclusively, that the yield of Gas is from 9700 to 9800 feet per ton, and that the quality of the Gas, without any admixture of Cannel, is over 16 candles, as tested by the officer appointed by the Metropolitan Board of Works, using the London Gas Referees test.

The Coke is of excellent quality, and in quantity amounts to about 40 bushels from a ton of Coal.

The annual consumption of Coal amounts to about 75,000 tons.

GEORGE LIVESEY, Engineer and Secretary.

P.S.—I am at this date, Feb. 15, 1875, still using Holmside Coals as largely as ever, and am quite as well pleased with them as when I gave the above certificate.

GEORGE LIVESEY.

We are this year, 1878, using 60,000 tons of Holmside Coal. GEORGE LIVESEY.

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All negotiations respecting M. Brémond's patented process for preventing Deposits of

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Now in use by all the Principal Gas and Water Companies in the United Kingdom.

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Drills, 1s. 6d. each.

Machines sent on approval, if desired.

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GLOBE METER-WORKS,

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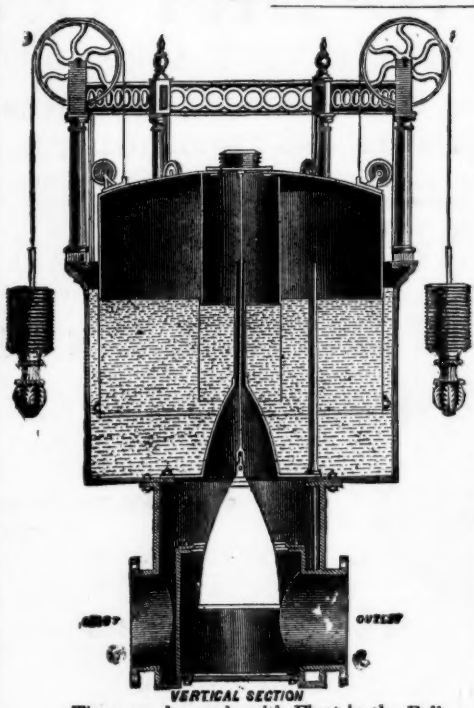
Beg to submit to Gas Engineers their

PATENT COMPENSATING GAS GOVERNOR,

Which is designed to give an uniform pressure at the Outlet to the Main at all draughts up to the full quantities which the Governors are made to control, such outlet pressure being less than the initial pressure.



VERTICAL SECTION

The uniformity of pressure is obtained by introducing a compensating chamber into the Bell or Holder of the Governor, which compensator is of the same area as the valve, both of which are operated on by the initial pressure, thereby placing the valve in equilibrium, no matter what the initial pressure may be. The action on the Bell is by the Gas passing along a pipe from the outlet, and the pressure is regulated by weights in connexion with the Bell as required.

From the sectional elevation attached hereto, it will be seen that only the Gas required to operate the Bell comes in contact with the water of the tank, which water will remain comparatively sweet and free from odour. That in case of accident to the Bell, no more Gas can escape than would pass up the pipe covering the valve-rod and Bell supply-pipe.

These Governors have been made and sent out of various sizes for from 2 to 24-inch Mains, and give most satisfactory results.

They can be made with Float in the Bell, or counterpoise as per section.

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JAMES PATERSON Esq., Gas Engineer, of the Warrington Gas Company, reported, Aug. 10, 1875:—

"This Coal possesses remarkable qualities as a gas and coking coal, and appears SECOND TO NONE IN THE KINGDOM. It contains the large quantity of 699 lbs. of illuminating matter, and 1498 lbs. of coke to the ton, and produces **12,240** cubic feet of 16·66 candle gas."

The above Company are raising nearly a thousand tons of the Real Old Silkstone Gas Coal per working day.

PRICES QUOTED TO ANY RAILWAY STATION, OR F.O.B. HULL, GRIMSBY, GOOLE, KEADBY, LIVERPOOL, AND FLEETWOOD.

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MANUFACTURERS OF

CONSUMERS IMPROVED GAS-METERS;

IMPROVED DRY GAS-METERS, in Cast-Iron and Tin Cases,

OF THE HIGHEST EXCELLENCE,

Warranted to measure correctly, and not to vary.

STATION METERS AND GOVERNORS,

EXPERIMENTAL METERS, PHOTOMETERS, GASHOLDERS, &c.

Established

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NEAR LEEDS,

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SPECIAL NOTICE.—Our Patent Machine-made Retorts have now been in *actual work* nearly 1000 days, and are yet in good order. References on application.

July 2, 1877.

NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS AND COLLIERIES,

NEAR SHEFFIELD.

CELEBRATED SILKSTONE GAS COALS.

The various descriptions of Gas Coal produced from the above Collieries possess an unequalled reputation, combining in a large degree the constituents essential for the production of the best quality of Coke and Gas of a high illuminating power.

A recent extensive development of the Collieries enables us to offer increased supplies.

JAS. PATERSON, Esq., of Warrington, after testing various qualities of our Coal, has sent the following testimony of their merits:—

"*Warrington Gaslight and Coke Company,*
Offices, Mersey Street, Warrington, April 23, 1877.

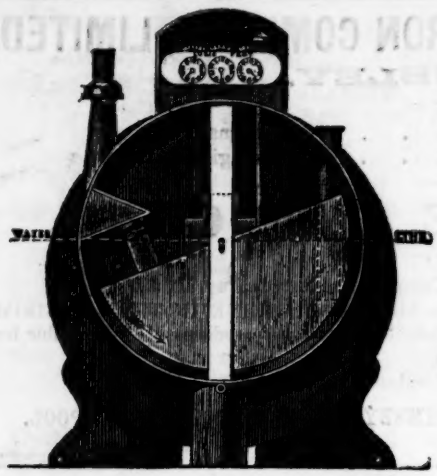
"MESSRS. NEWTON, CHAMBERS, AND CO.,

"GENTLEMEN,—After carefully testing the various samples of Gas Coals sent from your Collieries for analysis, I have pleasure in reporting them as belonging to the highest class of Gas and Coking Coals.

"The average of Nine samples gives a yield of **12,500** cubic feet of **15½**-Candle Gas, being equivalent to **664** lbs. of sperm per ton, and **1420** lbs. of fixed carbon of a very superior quality. All the samples bear a close relation to each other in value.

"Yours truly, "JAMES PATERSON."

Full particulars will be sent on application to us—address as above.



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UNVARYING WATER-LINE GAS-METER.

(SANDERS AND DONOVAN'S PATENT.)

"Unquestionably the best Water Gas-Meter now in use."—THOS. G. BARLOW, C.E.

Over 120,000 in action.

MANUFACTURERS:

THE GAS-METER COMPANY, LIMITED,

KINGSLAND ROAD, LONDON;

WITH

Branch Manufactories at DUBLIN and OLDHAM.

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MANUFACTURERS OF

"WET" AND "DRY" GAS-METERS,

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METERS, BOXES, REGULATORS, AND ALL REQUISITES FOR PUBLIC LIGHTING.

TESTING APPARATUS for all purposes relating to Gas, &c.

MR. VERNON HARCOURT'S COLOUR TESTS,

Descriptive particulars, per post, 2d.

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R. LAIDLAW AND SON,

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Manufacturers of

CONSUMERS IMPROVED WET GAS-METERS,

THE UNVARYING WATER-LINE GAS-METERS,

IMPROVED DRY GAS-METERS, in Cast-Iron or Tin-Plate Cases;

STATION-METERS, ALL SIZES, up to 15 feet Square, with PLANED JOINTS;

Experimental Meters, Photometers, Pressure-Gauges,

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IMPROVED HYDRAULIC CRANES,

Effecting a great saving in the cost of discharging Coals from Vessels, Barges, &c. Several of these Cranes, with the necessary power, are now being erected at the Beckton Gas-Works.

DIRECT-ACTING HOISTS

For LIFTING RAILWAY WAGGONS to RETORT-HOUSE STAGEWAY; CAPSTANS for HAULING WAGGONS, &c.,

HYDRAULIC RAMS for Lifting and Lowering Purifier Covers.

Sixteen now in course of erection at Beckton, applied to Covers 30 feet square.

GAS AND WATER PIPES, ROOFING, BOILERS, &c.

SULPHATE OF AMMONIA APPARATUS,

IN SUCCESSFUL OPERATION AT THE NEW WORKS OF THE NEWCASTLE AND GATESHEAD GAS COMPANY.

For particulars, apply to

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London: Printed by WILLIAM BOUGHTON KING (at the office of Clayton and Co., 17, Bouverie Street, Fleet Street); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, September 3, 1878.